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THE RENAL FACTOR IN CONTINUED ARTERIAL HYPERTENSION NOT DUE TO GLOMERULONEPHRITIS, AS REVEALED BY INTRAVENOUS PYELOGRAPHY*

A Study of Two Hundred and Twelve Cases, with a Report of the Results of Nephrectomy in Nine Cases

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BOSTON

SINCE Goldblatt and his co-workers[1] have demonstrated that renal ischemia in experimental animals causes continued arterial hypertension not dependent on nervous connections, but probably due to a pressor substance elaborated by the affected kidney, clinicians have sought to apply this knowledge in the elucidation of hypertension in man. For instance, hypertension has been reported in association with the following conditions obstructing arterial blood flow of the kidneys: thromboarteritis obliterans of the small renal arteries[2]; arteriosclerotic occlusion of the main renal arteries[2]; compression of the main renal artery and vein, together with an intravascular muscle plug in the main renal artery, a peculiar congenital anomaly in an ectopic pelvic kidney[3]; and compression of the renal arteries by a firm mass, such as a lymphosarcoma.[4] Longcope[5] in a prolonged follow-up of 22 cases of pyelonephritis found 12 with intermittent or continuous elevation of the blood pressure. Butler[6] reported 15 children with chronic pyelonephritis and hypertension over a period of years before diminution of kidney function. Peters[7] was impressed by the frequency with which pyelitis appeared as a precursor, associate or sequel to toxemias of pregnancy. Weiss and Parker[8] studied 100 selected cases of pyelonephritis, all necropsied, and described the gross and microscopic characteristics, concluding that pyelonephritis is an important cause of renal vascular narrowing and that hypertension when it occurs is of the Goldblatt type. Others[9, 10] report a variety of urologic lesions associated with hypertension.

There is no doubt that removal of the affected kidney in a number of patients with unilateral renal disease associated with hypertension has had a marked and beneficial effect on the blood pressure, though one hesitates to say that the patients are cured until they have been observed for several years. One of Butler's[6] cases was that of a boy of seven with acute and chronic active pyelonephritis who had a normal blood pressure twenty months after nephrectomy. Barker and Walters's case[11] was that of a man of forty-two with a chronic atrophic pyelonephritic kidney, with a normal blood pressure over two months after operation. These authors subsequently refer to 4 similar cases of their own with normal blood pressures six, twelve, thirteen and sixteen months after operation. Barney and Suby's[12] case was that of a ten-year-old girl with chronic atrophic pyelonephritis, whose blood pressure was normal twenty-one months after nephrectomy. Leadbetter and Burkland's[3] case was that of a Negro aged five years with an ectopic kidney, the renal artery and vein being compressed in a groove in the kidney tissue. There was also an obstructive intravascular muscular plug in the main renal artery. The blood pressure was normal eighteen months after nephrectomy, including follow-up subsequent to the case report. Bartels and Leadbetter's[13] case was that of a woman of thirty-seven with unilateral hydronephrosis but no evidence of extensive pyelonephritis, whose blood pressure was normal ten months after nephrectomy. Crab-

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tree's[14] case was that of a woman of twenty-seven with a unilateral pyelonephritis and constriction of the ureter, whose blood pressure was normal for ten years except for pressor responses to 160 and 190 mm. on two occasions, sustained hypertension again appearing in the eleventh year after operation. Schroeder and Fish[15] report the results of nephrectomy for hypertension in 7 cases with unilateral renal disease. Two were improved and 2 slightly improved, but all were still actually or potentially hypertensive. The two most favorable cases showed the least evidence of vascular disease in the surgical specimens. One of the successful cases was that of a man of thirty-three with hydronephrosis and hydroureter, with constriction at the ureterovesical junction on the left and with nephroptosis, ureteral angulation and slight hydronephrosis on the right. After left nephrectomy there was a marked and sustained fall in the blood pressure for sixteen months. The other successful result was obtained in the case of a woman of twenty. The removal of a hypoplastic kidney on one side was followed by a marked and sustained lowering of the blood pressure for eleven months.

During the last four years we have included genitourinary studies in the survey of our cases of essential hypertension, in general confining this part of our study to patients under fifty, and including at least an intravenous pyelogram in all new cases. Of 596 patients diagnosed as having essential hypertension, intravenous pyelograms were taken in 212, of whom 124 were women and 88 men. Classified according to degree of organic change and clinical characteristics,* 66 cases were Grade 1, or early hypertension; 46 Grade 2, or moderate; 41 Grade 3, or late benign; and 56 Grade 4, or malignant. Grading was doubtful in 3 cases.

In reviewing these 212 cases we were interested in ascertaining the incidence of deformities of the kidneys or ureters — whether congenital or acquired, whether due to infection or metabolic fault or to some other cause — which were of sufficient degree to obstruct the flow of urine or impair the renal function on one or both sides. Significant abnormalities from this point of view were found in 47 cases (22 per cent), and are shown in Table 1. The significance of the pyelograms in 4 cases was doubtful; the remaining 161 patients either had normal pyelograms or those showing minor variations, or had chronic vascular nephritis, the pyelograms showing small, poorly functioning kidneys (Table 2).

TABLE 1. *Significant Abnormalities in 47 of the Cases Studied by Intravenous Pyelography.*

FINDING	NO. OF CASES
Hydronephrosis	33
Pyonephrosis	16
Stone	14
Atrophic or fetal contracted kidney or both	13
Hydronephrosis with possible aberrant vessel	7
Possible tuberculosis	2
Tumor or cyst	1

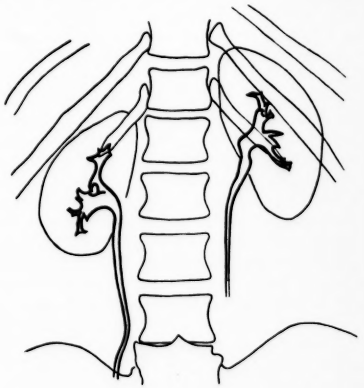

FIGURE 1.

A tracing from the x-ray plate of a normal intravenous pyelogram in a patient with arterial hypertension. The outlines of the pelves and calyces are shown for comparison with those in Figures 2 and 3. The rather low right kidney is not considered significant.

We cannot emphasize too strongly the maintenance of a critical attitude toward the findings of intravenous urography. The kidney and pelvis on one side may be in a different plane and

*Hypertension, Grade 1: Variable hypertension, 150 to 200 mm. systolic, 100 to 120 diastolic, occasionally falling to normal levels (140 systolic, 90 diastolic, or less) with rest or sedatives, occasionally under stress going above the limits noted; minimal, if any, changes in fundi, as represented by narrowing of arterioles; minimal, if any, changes in heart or kidneys. This is early or mild hypertension.

Hypertension, Grade 2: Variable hypertension, 170 to 250 mm. systolic, 110 to 130 diastolic, usually at the lower levels, occasionally even lower, but rarely if ever falling to normal with rest or a sedative; the fundi showing arteriovenous compression, narrowing and caliber changes in the arterioles; the heart showing slight, if any, enlargement (prominence in the region of the left ventricle); the urine showing no change or slight grades of albuminuria and minimal numbers of formed elements in the sediment; the renal function being normal or slightly impaired by concentration and intravenous phenolsulfonephthalein tests. This is moderate hypertension.

Hypertension, Grade 3: Variable but usually upward hypertension, almost always over 170 mm. systolic and 110 mm. diastolic; the fundi showing arteriovenous compression, caliber changes in arterioles, wide light reflexes, often exudates or hemorrhages in the retinas; the heart usually enlarged, with possibly symptoms and signs of actual or impending congestive failure or even symptoms of anginal failure; the urine often showing albumin and casts; renal function often impaired, but actual failure (uremia) unusual; cerebral accidents sometimes occur. This is late benign hypertension, as a rule of many years' standing.

Hypertension, Grade 4: Blood pressure, especially the diastolic, usually very high; difficulties often of recent onset, in a patient almost always under fifty, often under forty, the cardinal sign being edema of the optic disks, with or without exudate and hemorrhage; cardiac enlargement and congestive or anginal heart failure often present; renal impairment and failure common. This is malignant hypertension.

appear abnormal as compared with those of the opposite side. At best the pyelogram is only the shadow of the organ studied. For instance, in one case at dorsolumbar sympathectomy a kidney, the pyelogram of which had shown it to be small and poorly functioning, was found to be rather small but normal-appearing. In several

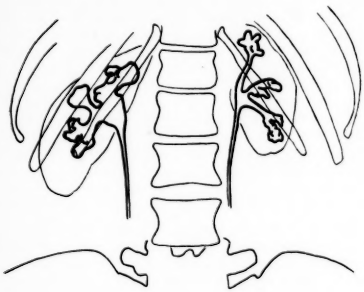

FIGURE 2.

A tracing of a pyelogram showing evidence of bilateral pyelonephritis in a patient with Grade 1 hypertension, found incidentally at a routine health examination. The calyces are blunted, and the pelvis on the right is somewhat dilated.

cases we have had the opportunity of examining kidneys previously depicted by urography. It is obvious that there exist considerable congenital variations in size which are apparently within normal limits as judged by gross observation, urography — both intravenous and retrograde — and split function. In order to get the true picture one must check significant intravenous urographic findings by retrograde pyelograms,

TABLE 2. *Insignificant Abnormalities and Doubtful and Negative Findings in 165 of the Cases Studied by Intravenous Pyelography.*

FINDING	NO. OF CASES
Poor excretion of the dye in one or both kidneys	38
Minor anatomic variations in pelves or calyces or both	22
Kidneys small	17
Position abnormal without deformity of renal pelvis	6
Calyx or pelvis slightly dilated	5
Minor abnormality of ureter	4
Small area of calcification in kidney	1
Probable calcification left renal artery*	1
Doubtful	4
Negative	89

*If this calcification represents narrowing of the artery, the finding may be very significant as a cause of renal ischemia, but there is no means of establishing the diagnosis ante mortem.

split kidney function and urinary cultures. It is hardly necessary to mention that care must be taken when injecting the dye for retrograde visualization of the kidney pelves, since too much dye or too much pressure may cause a normal pelvis to appear dilated. When these normal variations and possibilities of error are kept in mind and abnormal findings are carefully checked, intravenous urography is a satisfactory and fairly accurate method for indicating abnormalities of the kidneys, pelves and ureters, provided renal function is not seriously impaired. In Table 2 are listed abnormalities considered insignificant from our point of view.

Thus 47 (22 per cent) of our patients with essential hypertension showed important abnormalities when studied by intravenous urography. Of these, 31, or 76 per cent of those from whom we obtained adequate data, had family histories of degenerative vascular disease (hypertension, heart disease, nephritis, sudden death, cerebral accidents or diabetes in siblings, parents, uncles, aunts or grandparents); the family histories were negative in 10 and uncertain in 6. This incidence is characteristic of essential hypertension in general.[16]

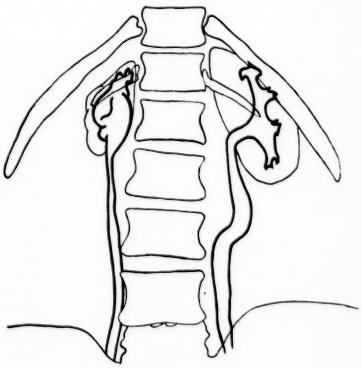

FIGURE 3.

A tracing of the intravenous pyelogram in the patient (Case 9) who has greatly benefited by removal of the right kidney, showing a small kidney with a dilated and deformed pelvis on the right, and a rather dilated and tortuous ureter on the left.

As a control group we have compared 43 patients with pyelonephritis without hypertension from whom accurate family histories were obtained. Of these, 17 (40 per cent) had histories of degenerative vascular disease. The median ages of these two groups, as well as the group with hypertension and negative pyelograms, were comparable — 39.0, 42.2 and 42.5 years respectively.

A unilateral abnormality of the kidney or pel-

vis was found in 34 (72 per cent) of the 47 cases with abnormal pyelograms. In these cases we considered the possibility that the affected organ was elaborating the hypothetical pressor substance (Goldblatt syndrome). Hence, with the hope of relieving the hypertension and not because of the renal condition, which in all cases was asymptomatic, and in many of them was revealed only by the routine study with intravenous pyelogram, the affected kidney was removed in 9 cases. Our observations follow:

Case 1. A man of 43 with Grade 4 (malignant) hypertension had a unilateral acute and chronic pyelonephritis. He died 2 days after nephrectomy from bilateral adrenal infarction. The surgical specimen showed a large cystic hydronephrotic kidney, the parenchyma measuring from 1 to 2 mm. in thickness. There was definite acute and chronic pyelonephritis, acute infection being superimposed on an old hydronephrosis. The arteries showed very slight fibrous intimal thickening. The arterioles showed moderate medial hyaline changes. No glomeruli or tubules were seen. The remaining kidney at autopsy was large, and showed acute and chronic inflammation of the parenchyma. The arteries showed slight fibrous intimal thickening, and the arterioles moderate to marked medial hyaline change with slight hyperplastic proliferation. No colloid casts were seen. Diagnosis: chronic vascular nephritis.

Case 2. A man of 36 with Grade 4 (malignant) hypertension appeared to have a unilateral moderate hydronephrosis. Urine culture showed *Bacillus coli* from the bladder and from the affected kidney. There was no favorable effect on the symptoms or the blood pressure after nephrectomy. The patient died of a cerebral accident 1 year and 1 month after operation. In the surgical specimen the arterioles showed medial hyaline degeneration, and the arteries fibrous intimal thickening. There was no evidence of infection. Diagnosis: chronic vascular nephritis.

Case 3. A man of 45 with Grade 3 (late benign) hypertension had unilateral pyelonephritis and hydronephrosis. Culture of the urine showed no growth. After nephrectomy there was definite symptomatic improvement but no change in the blood pressure. The heart showed progressive enlargement until death from a cerebral accident 1 year and 3 months after operation. The kidney removed at operation weighed 32 gm. The pelvis was dilated to 10 cm. in circumference. The glomeruli were obliterated. A moderate number of colloid casts were seen, and there was lymphocytic infiltration. The arteries showed moderate to marked fibrous intimal thickening. The arterioles showed slight hyperplastic proliferation. There was no hyaline degeneration. Diagnosis: congenital aplasia and chronic pyelonephritis.

Case 4. A woman of 33 with Grade 3 (late benign) hypertension had unilateral renal calculi and hydronephrosis, hyperparathyroidism having been alleviated by removal of a parathyroid adenoma 3 years previously. Culture of the bladder urine showed *B. coli*, but culture of the urine from the infected kidney showed no growth. Nephrectomy was followed by slight temporary improvement in the blood pressure for 3 months after operation. One year and 11 months after operation the blood pressure had returned to the preoperative level. The surgical specimen weighed 78 gm. There were small foci of healed pyelonephritis in which the arterioles showed hyperplastic proliferation. The arteries were negative. There was lymphocytic infiltration in the pelvis. A few colloid casts were present in the scarred areas. Most of the kidney parenchyma was intact. Diagnosis: focal pyelonephritis.

Case 5. A woman of 26 with Grade 3 (late benign) hypertension had a unilateral hydronephrosis. Culture of the urine from the infected kidney showed *B. coli* and *Staphylococcus aureus*. After removal of the affected kidney the blood pressure was somewhat lower for about a year. The eye grounds improved. During the 2nd year after operation the blood pressure returned to the preoperative level. There was an illness suggesting recurrent pyelonephritis in the remaining kidney. Four years after operation there appeared to be progressive increase in the size of the heart, the blood pressure remaining at about the preoperative level. The surgical specimen weighed 61.5 gm. There was marked hydronephrosis. In scarred areas there was moderate to marked medial and intimal hyalinization. There were no definite arteriolar hyperplastic changes. The arteries were negative. There was slight lymphocytic infiltration. A few colloid casts were seen in the scarred areas. Diagnosis: focal pyelonephritis.

Case 6. A neurotic woman of 50 with Grade 1 (mild, variable) hypertension had a cystic kidney with hydronephrosis. *B. coli* was grown from the bladder urine. For 6 months after nephrectomy there was no improvement in the blood pressure. The surgical specimen weighed 119 gm. There were gross cysts up to 3 cm. in diameter. There was scarring in the region of the cysts. A few tubules showed colloid casts. The arteries showed slight fibrous intimal thickening. The arterioles showed medial hyaline changes, but there was practically no hyperplastic proliferation. Lymphocytic infiltration was slight. Diagnosis: chronic vascular nephritis.

Case 7. A woman of 41 had Grade 1 (mild) hypertension and an atrophic non-functioning kidney. A culture of the urine showed no growth. The blood pressure showed no change during one year after nephrectomy. The surgical specimen weighed 7 gm. It showed congenital atrophy. The arteries showed marked fibrous intimal thickening. The arterioles were negative. There was no lymphocytic infiltration. Diagnosis: probable congenital atrophic kidney.

Case 8. A schoolgirl of 19 with Grade 1 to 2 (mild to moderate) hypertension had a contracted kidney with poor function on the left side. There was a history of pyelitis 9 years previously. Hypertension was known to have been present for only 5 months, having been found incidentally. Cultures of the urine from both kidneys were negative. Six weeks after nephrectomy the blood pressure was not significantly lowered. Six months later the blood pressure was somewhat lower as a result of sulfocyanate therapy, but it was evident that operation had not significantly altered the condition. The surgical specimen weighed 14 gm. The arterioles showed marked hyperplastic proliferation in scarred areas, but no hyalinization. The arteries showed moderate fibrous intimal thickening. Lymphocytic infiltration was very slight. Colloid casts were seen in the tubules in scarred areas. Diagnosis: chronic pyelonephritis.

Case 9. A girl of 17 with Grade 4 (malignant) hypertension showed edema of the optic disks and exudate and hemorrhages in the retinas, and had a contracted, pyelonephritic kidney. Hypertension had been found during an illegitimate pregnancy 4 years previously. For 1 year

and 10 months after nephrectomy the blood pressure has been markedly and significantly lowered (Fig. 4), although both systolic and diastolic pressures are abnormally high and the blood pressure shows a definite pressor response to fatigue. The eye grounds have been much improved. The severe preoperative headaches have been almost entirely relieved.

The surgical specimen weighed 7 gm. The arterioles showed marked hyperplastic proliferation. There was slight hyaline change. The arteries were negative. There

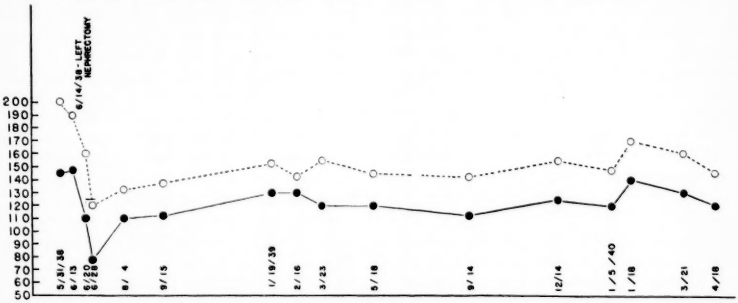

FIGURE 4.

This chart shows the blood-pressure levels for the year and ten months following the removal of a contracted kidney with a dilated pelvis in a girl of seventeen with Grade 4 malignant hypertension (Case 9). A tracing of the pyelogram is shown in Figure 3. The patient was much better symptomatically. The eye grounds were greatly improved. The systolic blood pressure was markedly and significantly lowered; the diastolic pressure was lower, but still far from normal.

was infiltration of the parenchyma, pelvis and ureters with lymphoid follicles. The tubules were hypertrophic and colloid casts were seen. Diagnosis: chronic pyelonephritis.

Thus in 9 patients in whom nephrectomy was performed for unilateral renal disease in association with hypertension, including both early and late benign types as well as malignant, a favorable effect on the blood pressure was obtained in 1 (Case 9), and this patient continues to be definitely hypertensive, although very much relieved.

DISCUSSION

It is apparent that careful urological study of patients with continued arterial hypertension will reveal a considerable number with significant abnormalities of the kidneys, kidney pelves and ureters — in our experience 22 per cent.

In considering these data it is well to recall the frequency with which various urologic lesions such as pyelonephritis, including pyelonephritis of pregnancy, hydronephrosis and calculus disease, are observed over long periods without the development of hypertension. It is interesting that Peters[7] found that 27 per cent of patients with pyelitis during pregnancy showed hypertension, while Barney and Suby[12] report that 25 per cent of 305 patients with pyonephrosis, pyelonephritis, hydronephrosis or pyelitis had systolic pressures of 140 mm. or over, and Weiss and Parker[8] estimated that 15 to 20 per cent of patients with malignant hypertension had evidence of pyelonephritis. Continued arterial hypertension is a fairly common condition, and the coincidental presence of a certain number of the commoner urologic lesions is likely. The significance of the figures just quoted awaits critical mathematical treatment of the comparative incidence of hypertension and urologic lesions in the general population. Some of these abnormalities are due to congenital aplasia of one kidney, with or without superimposed infection. Some are due to chronic pyelonephritis, inactive or with low-grade chronic infection, while others may be primarily due to lesions obstructing the urinary outflow. Many of these lesions may have antedated the onset of hypertension by many years.

In their monograph on pyelonephritis Weiss and Parker[8] place much emphasis on the pathologic findings in the renal arterioles. They believe that chronic infection affects the arterioles in some way so as to bring about a hyperplastic intimal change, which in turn causes ischemia and then hypertension. This intimal hyperplastic change, according to these authors, after leading to luminal narrowing or even obliteration, is the *sine qua non* of hypertension in cases of pyelonephritis. When their criteria are applied to our cases pathologically, only Cases 8 and 9 show changes consistent with true hypertensive pyelonephritis. They both showed marked arteriolar

hyperplastic changes, lymphocytic infiltration and colloid casts in the tubules. Although most of the other cases showed pyelonephritis, usually with hydronephrosis, the vascular changes were those seen in ordinary vascular nephritis; that is, they consisted of medial hyalinization of the arterioles and fibrous intimal proliferation of the arteries, or if there were hyperplastic changes, they were of insufficient severity to have had any effect. The fact that one of these two cases (Case 9) has been much improved by nephrectomy suggests that the arteriolar hyperplastic change plays a dominating role in the production of the hypertension. The fact that the other case did not respond may possibly be explained by Weiss and Parker's theory that the nephrectomy had been done after the vicious circle — pyelonephritis leading to hypertension, which in turn leads to vascular nephritis in the other kidney — had been established.

As intimated above, we have not sufficient data on the incidence of hypertension and of renal lesions in the general population to reach a mathematical estimate of how often such a renal lesion may be merely incidental. Furthermore, no clinical tests now available enable one to predict accurately the character of the changes in the renal vessels, or to determine whether the hypertension, if due to renal ischemia on one side, may have induced vascular disease in other tissues, including the originally unaffected kidney. In considering nephrectomy, the best possible judgment after careful study is not very good, as demonstrated by only one strikingly favorable result in our group of 9 cases, and only two in the group reported by Schroeder and Steele.[9]

In exercising this clinical judgment, the age of the patient and the duration of the hypertension should be considered. In general, it may be said that one should not advise nephrectomy for a unilateral renal lesion when associated with hypertension in women over forty-five or men over fifty, since after these ages the onset of continued arterial hypertension of unknown etiology is likely to appear. The ages of the cases in the literature with apparently successful results referred to above range from childhood to forty-two. It is generally impossible to estimate accurately the duration of hypertension. However, one would suppose that if it has been known to have been present for a long time, nephrectomy is contraindicated, since vascular changes in the other kidney might be expected. Nevertheless, in our only favorable result the patient was known to have had hypertension during an illegitimate pregnancy four years previously, while in Case 8, closely similar both clinically and pathologically, hypertension was known to have been present for only five months, although pyelitis had occurred nine years previously. Presumably, the younger the patient and the more recent the onset of hypertension, the better the chance of a favorable result following nephrectomy.

One cannot afford to overlook the factor of congenital predisposition in patients with continued arterial hypertension. Patients with chronic pyelonephritis, both active and inactive, and those with lesions obstructing the urinary outflow have been followed for many years without the appearance of continued arterial hypertension. The difference between these patients and those with similar urologic lesions and also continued arterial hypertension may lie in the degree of congenital predisposition. Our control group of patients with pyelonephritis but without hypertension referred to above is small. Nevertheless, the family histories suggest that a predisposition to degenerative vascular disease was present in only 40 per cent, an incidence characteristic of 100 miscellaneous ward patients in whom no vascular disorder was present.[16] On the other hand, the patients with such deformities and with continued arterial hypertension had family histories indicating a tendency to vascular disease in 75 per cent, an incidence characteristic of any series of patients with continued arterial hypertension. Pyelonephritis, hydronephrosis, calculus disease, cyst, tumor or external obstruction of the urinary tract, with or without infection, if not incidental, may be merely participating or precipitating causes initiating the pressor responses in patients predisposed to arterial hypertension. Thus, unilateral renal disease may precipitate continued arterial hypertension in a congenitally predisposed individual sooner than the natural factors associated with the menopause or with advancing years. Crabtree's[14] case is interesting in this connection in that removal of a kidney for unilateral renal disease at the age of twenty-seven was followed by freedom from hypertension for ten years, except for two observations. In the eleventh year, however, persistent hypertension reappeared. This suggests that nephrectomy removed a precipitating cause, although the congenital predisposition remained.

Conclusions

Forty-seven (22 per cent) of 212 patients with continued arterial hypertension not due to glomerulonephritis showed congenital or acquired deformities of the pelves or ureters by urography.

The deformity in the pyelogram was unilateral

in 34 (72 per cent) of these 47 cases, or 16 per cent of the 212 cases studied.

Such deformities are often incidental, but if significant in the etiology of the hypertension probably represent a participating or precipitating, rather than a major, factor.

Surgical removal of the presumably offending organ in 9 cases resulted in marked improvement in the blood pressure and the symptoms for one year and ten months in 1 case, although this patient still remains definitely hypertensive.

In cases of unilateral renal disease associated with persistent hypertension the decision to remove the affected kidney, with the hope of curing or modifying the course of the hypertension, is based on three assumptions: that the lesion is not incidental; that there is no vascular disease in the remaining kidney; and that one will not be faced with recurrent pyelitis in the remaining kidney.

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NEUROGENIC DYSFUNCTION OF THE BLADDER DUE TO SPINAL ANESTHESIA*

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NERVE damage resulting from spinal anesthesia is fortunately a rare complication, but apparently it is much commoner than is generally recognized. Of the various sequelae of spinal anesthesia which have been reported, paralysis of the bladder appears to be one of the most serious. In the majority of the cases the bladder dysfunction persisted over a period of many months or years, and death not infrequently occurred as a result of infection of the urinary tract. However, as the reports deal primarily with the neurological and not with the urological aspect of the cases, it seems worth while to report a case in which the patient recovered following resection of the presacral nerve. This case is, so far as we know, the only one so treated, although it appears that the operation might have been successfully applied to other cases which have been reported.

It is interesting that the neurologic lesions resulting from spinal anesthesia are extremely varied, both in character and in severity. Loeser[1] reports 5 cases of peripheral neuritis affecting isolated peripheral nerves which he had seen in one year. These cases followed the giving of small doses of procaine. Likewise, cases of ocular paralysis lasting several weeks or more have been reported.[2, 3] Smith[4] saw a case of incomplete transverse myelitis following the use of Spinocain. Hyslop[5] reports a case of aseptic meningitis resulting from the administration of 200 mg. of Nupercaine. One of us (E. L. P.) has seen a similar case following the giving of 150 mg. of novocain. Ferguson and Watkins[6] report 14 cases of injury to the cauda equina which they had personally observed, and have also collected 16 other cases from the literature. In these, the most striking and most serious symptom was immediate retention of urine, followed at a later period by incontinence. The patients continued to have residual urine and difficulty in urinating for periods varying from several weeks to over two years. The less serious symptoms in this group consisted of loss of anal tone, an area of saddle anesthesia and changes in the reflexes of the legs. In some cases cystometric and cystoscopic studies were made after a period

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of several months and the patients were found to have trabeculated, hypertonic bladders, associated with a variable amount of residual urine. In the proceedings of the Royal Society of Medicine for 1936–37, Critchley[7] reported 17 cases of neurologic sequelae of spinal anesthesia. Eight of these patients had paralysis of the bladder and only 3 recovered spontaneously. Critchley states, "A very significant number of nervous sequelae are completely overlooked by both the surgeon and the anesthetist." This opinion has been expressed by numerous other writers and appears to us to be wholly justified. Other cases of disturbance of the bladder mechanism and other neurologic manifestations have been reported by Boisseau,[8] Nonne and Demme,[9] Maclachlan,[10] Brock, Bell and Davison,[11] Lindemulder,[12] Ashworth[13] and others.*

Case Report

The patient (No. 75570), a robust-looking man of 60, was admitted to the Lynn Hospital on November 9, 1938. Eight weeks previously he was operated on in another hospital for acute appendicitis under spinal anesthesia, given by an experienced anesthetist who used 100 mg. of novocain and 14 mg. of Pontocain. The operation was uneventful except that following it the patient was unable to void. He was treated both by intermittent catheterization and by continuous drainage. For several weeks before entry he had been at home and had been catheterizing himself several times a day. During this time, although he had discomfort when his bladder was full, he had been unable to void. Mecholyl had been tried without improvement. Except for marked constipation and weakness he had no symptoms. The past history was irrelevant. At no time prior to the operation had there been difficulty in urinating, frequency or other symptoms suggesting disturbance of the urinary tract.

Tests made during physical and neurological examinations had to be repeated over and over on account of the patient's unreliability. The significant findings follow. The rectal sphincter had normal tone and the prostate gland was not enlarged. The deep reflexes of the upper extremities were diminished, the abdominal reflexes were diminished to absent, the deep reflexes of the lower extremities were hyperactive, and there were a Babinski and ankle clonus on the right. Sensation of light touch, vibration sense and muscle-position sense of the lower extremities were definitely impaired. Wassermann tests of the blood and spinal fluid were negative. Lumbar punctures done on two occasions showed a large number of red blood cells and no white cells. There was no xanthochromia, and it was uncertain whether or not the presence of blood was caused by the trauma of the punctures. The dynamics, sugar content and gold-sol curve were normal, the globulin negative; and the total protein was 200 mg. per cent at one time and 125 mg. at the other. The urine examination showed evidence of marked sepsis and consequent diminished renal function. The rest of the laboratory examination was negative. Cystoscopic examination showed no trabeculation of the bladder, no prostatic obstruction and no hypertrophy of the internal sphincter. Neither did there appear to be any funneling of the bladder neck. The resistance of the sphincters to the passage of the cystoscope and the sensation in the urethra appeared to be diminished. Intravenous pyelograms showed normal kidneys and bladder.

On admission the patient was put on catheter drainage. Preoperative cystometric studies were made the day after admission and again 19 days later (Fig. 1). The findings

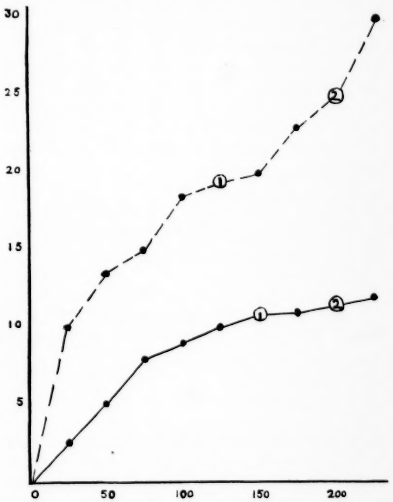

Figure 1. *Cystometric Studies.*

The solid line indicates the preoperative readings; the dotted, the postoperative ones. At (1) *occurred the first desire to void; and at* (2), *the pain of fullness. The abscissa denotes the volume of the injected fluid, expressed in cubic centimeters; and the ordinate, the intravesicular pressure, expressed in centimeters of water.*

on both occasions were essentially the same: the patient felt the desire to void when 100 to 150 cc. of fluid had been introduced into the bladder and had severe pain after the introduction of from 200 to 225 cc. A presumptive diagnosis of neurogenic dysfunction of the bladder was made. It was believed that the patient might have had a cord injury with particular involvement of the posterolateral tracts and probably some radicular injury.

On December 1, after 3 weeks of catheter drainage, the sepsis in the urinary tract had greatly improved and the catheter was removed. The patient, however, was still unable to void. As 2½ months had elapsed since he first developed acute retention, it appeared that the assumed damage to the spinal cord was permanent. Accordingly, on December 2 a presacral neurectomy was performed.

*In a recent personal communication to the author, Dr. Charles E. Rieser, of Atlanta, Georgia, cites a case which is almost identical to the one reported here. Dr. Rieser's case was that of a twenty-six-year-old man who had had an appendectomy under spinal anesthesia in November, 1939. Following this he had retention of urine for three months, which was treated by self-catheterization. No obstruction was seen at the bladder neck, and the neurological and spinal-fluid findings were negative. The retention was relieved by a transurethral resection of the internal bladder sphincter.

The patient made an uneventful convalescence. A cystometric study made 8 days after the operation showed definite increase of tone, the curve being on the average about 10 cm. of water higher than the preoperative ones (Fig. 1). The catheter was removed on the 10th postoperative day and the patient was able to void spontaneously for the first time. There was considerable residual urine at first, but each day this became less marked until, on the day of discharge, December 21, it was reduced to 190 cc.

Following discharge the patient did well. He voided once at night and every 4 hours by day. The stream, however, lacked force and the patient could empty his bladder better in the sitting position. When last seen, 7 months after discharge, he had no residual urine and the infection had almost disappeared. He complained of marked constipation and pain at the base of the spine, and stated that neither of these symptoms had been present prior to the first operation.*

It was presumed that the paralysis of the bladder in this case was due directly to nerve damage resulting from the spinal anesthesia. Why nerve damage occurs in some cases and not in others is hard to explain. From the experimental work done on this subject it appears that various cocaine derivatives have a destructive effect on nerve tissue, depending directly on their concentration. As we are dealing here with the urological rather than the neurological aspect of the subject, it will be sufficient to state that Davis, Haven, Givens and Emmett[14] and Lundy, Essex and Kernohan[15] produced lesions of the cord and spinal nerves in dogs with the intraspinal injection of procaine; and that MacDonald and Watkins[16] produced similar nerve destruction in cats by the same method. In the human cases which suffered from neurological complications, autopsy showed degenerative nerve changes similar to those found in the experimental animals. There has been but little work done on changes in the spinal fluid following the subarachnoid injection of cocaine derivatives in human subjects, but from the work of Iason[17] it would appear that there are definite, though not marked, changes in a high percentage of cases. Therefore it seems reasonable to suppose that some individuals have a greater susceptibility than others to the myelolytic properties of those substances and consequently are more likely to develop serious nerve damage. As the nerves supplying the bladder are the ones subjected to the greatest concentration of the anesthetic agent, it is not surprising that they are often damaged to a greater extent than are the other nerves. From the experimental work mentioned in this report, it is likely that temporary as well as permanent nerve damage may be produced by the various cocaine derivatives. Furthermore, it seems probable that similar mild cases of bladder paralysis may occur more frequently than is realized, but because of their spontaneous recovery and lack of other obvious neurologic lesions remain undiagnosed.

The successful result following presacral nerve resection in this case may be due to two factors: first, the sensation of the bladder was impaired little if at all; secondly, the diagnosis was made and treatment instituted at an early stage. This latter factor, as one of us (E. L. P.[18]) has already pointed out, seems to be the essential point in the handling of the neurogenic bladder. The classic cord bladder where there is complete loss of tone and sensation associated with funneling of the bladder neck is usually an end result. In this type of case the chronic overdistention that has developed has permanently damaged the bladder, and in spite of prolonged catheter drainage it remains hypotonic and the chances of a successful outcome are poor. On the other hand in early cases, as in the case under discussion, the bladder rapidly regains its tone on catheter drainage. When this occurs the cystometric curve is no longer of the hypotonic type. Thus the cystometric readings must be considered in connection with the phenomena of compensation and decompensation, with the realization that where compensation occurs the prognosis is good.

Urinary sepsis is of the greatest importance in these cases. This is best controlled and the function of the bladder best preserved by the use of an inlying urethral catheter. In this connection there are two extremely important points which are applicable to all cases of retention of urine. In the first place, the catheter used must be a small Foley catheter which will remain in place without a constricting band of adhesive tape and will allow free outward drainage of urethral secretions. In the second place, the drainage system must be closed so that infection does not enter from the outside, and so that irrigation may be carried on without disconnecting or opening the system. If these two prerequisites are adhered to, we believe the results will be fully as good as with the use of the ingenious but complicated system of tidal drainage described by Munro.[19]

Summary

The case is reported of a sixty-year-old man who was entirely well until an appendectomy was performed under spinal anesthesia. Following this

*The patient when seen on January 18, 1940, one year and four months after his last operation, felt well and had gained weight. He still complained of dull pain at the base of the spine and marked constipation, and of some difficulty in voiding. The knee jerks were hyperactive and the rectal sphincter slightly relaxed. There was 15 cc. of residual urine; the sediment was negative.

operation he had complete retention of urine lasting for two and a half months. Since a complete study of the case failed to show any other cause for this retention, it was assumed that the bladder dysfunction was due to nerve injury as a result of the spinal anesthesia. The retention of urine was relieved following a presacral nerve resection and the patient has remained well.

The literature on this subject is reviewed, and it is suggested that minor degrees of nerve damage may result more frequently from spinal anesthesia than is usually thought to be the case.

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RECURRENT GALLSTONE ILEUS*

Report of a Case

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CASES of intestinal obstruction due to gallstones occur often enough to make single case reports undesirable unless attended by some unusual feature of interest. The last attempt to estimate the reported cases was in 1925, when Moore[1] set the figure at about 400. In the last ten years, approximately forty-eight articles in English and eighty-nine in foreign languages have been published on this subject, many of which added several or more cases to those already reported.

The following case is rare because the patient, a seventy-nine-year-old woman, suffered from two episodes of acute intestinal obstruction within a three-month period. Each required jejunotomy and was followed by recovery. In 1929, Holz[2] listed but 5 cases in which gallstone obstruction had occurred in the same individual more than once; in 3 of these the second stone was removed during immediate convalescence from the first operation. Two cases of double obstruction, the recurrence coming within several days after operation, were also reported by Downes[3] and by Pybus,[4] but were not included in Holz's enumeration. In 1938, Schwarke[5] added another case, occurring in a sixty-nine-year-old woman, with recovery after operation. Thus in 5 of the 8 cases the second attack of ileus complicated the first convalescence. Four individuals survived, the oldest being a seventy-two-year-old woman.

The present case is the ninth to be reported, and the patient is the oldest individual in whom recovery has occurred.

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Case Report

A 79-year-old widow had had a radical mastectomy 7 years prior to her present illness. At that time routine preoperative x-ray examination revealed what was interpreted as a single large stone in the gall bladder. The patient had been troubled with intermittent gaseous indigestion for a great many years, usually following the ingestion of fatty food or pork. Occasionally she had experienced a sense of pressure across the epigastrium. However, she had never had a frank attack of cholecystitis, biliary colic or jaundice.

The patient was first seen in March, 1939, about 3 weeks prior to hospital entry, with pain in the left lower quadrant of the abdomen. Examination revealed only direct and rebound tenderness in the left lower quadrant. The diagnosis of diverticulitis seemed most probable. A barium enema on March 9 was unsuccessful because the patient

could not retain the barium. On the following day she expelled a moderate-sized gallstone from the rectum (Fig. 1). It had two facets, indicating that there were at least two more stones to be accounted for.

During the 2 weeks prior to admission on March 19, the patient had mild, intermittent, colicky pain across the lower abdomen, chiefly on the right side. Five days before admission she passed a second hard object, which felt like a stone but was not recovered. Two days before admission she commenced to have similar pain across the abdomen just below the umbilicus, associated with persistent vomiting. There was no tenderness, distention or audible hyperperistalsis. On the following day hospital admission was recommended because of persistent symptoms. At the time of entry the bowels had not moved for 2 days.

On physical examination at entry the patient was somewhat dehydrated. She was vomiting greenish intestinal

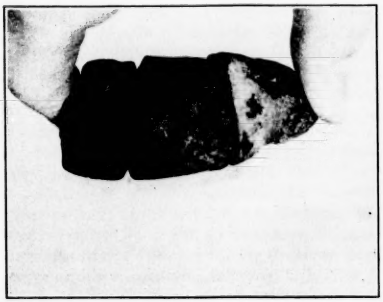

FIGURE 1. *Photograph of Stones.*

The stone on the right caused obstruction, but its weight and diameter were less than the defecated stone, which is on the left. The stone in the middle caused the second obstruction. A fourth stone was lost at defecation.

contents without fecal odor. She was quite obese, but appeared younger than her stated age. The blood pressure was 174/98, the pulse 86, and the temperature normal. The heart rhythm was regular, but there was a moderate blowing, apical, systolic murmur. The lungs were clear. The abdomen was very obese. The patient was unable to say whether the abdomen was any larger than normal, but there appeared to be some degree of distention, although it was far from tense. There was moderate tenderness over the lower abdomen, and a few high-pitched, peristaltic tinkles were heard above the umbilicus. An admission diagnosis of high intestinal obstruction, probably in the jejunum and due to an impacted gallstone, was made. A scout plate of the abdomen showed several dilated loops of small bowel, and an indistinct but definite ovoid shadow within the lumen of the intestine on the left side of the abdomen, which was assumed to be an impacted gallstone (Fig. 2).

The patient's condition was not good. The nonprotein nitrogen was 54 mg. per 100 cc., the carbon dioxide combining power 42 vol. per cent and the blood chlorides 379 mg. per 100 cc. The urinary output was scanty. In addition, there was a history of moderate dyspnea, some orthopnea and a productive morning cough. The patient had been treated for high blood pressure during the previous 3 years. Accordingly a day was spent in improving her condition by intestinal decompression and correction of deranged fluid and chemical balances.

On March 21, a jejunotomy was performed and an impacted gallstone was removed from the mid-jejunum. The operation was done under spinal anesthesia and was followed by a transfusion. The stone was milked proximally for 15 cm. prior to removal. No search was made for additional stones, nor was the region of the gall bladder palpated.

The patient made a very satisfactory convalescence and was discharged on the 14th postoperative day. In retrospect, it is apparent that it would have been well to have palpated gently the gall bladder and the intestine proximal to the site of obstruction at the time of operation.

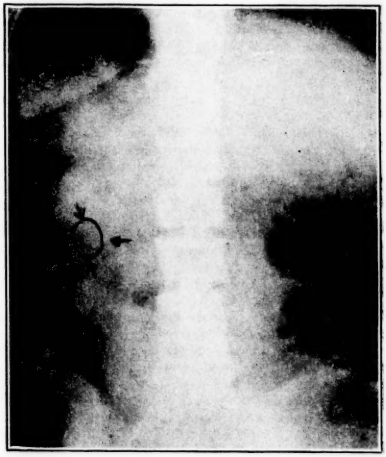

FIGURE 2. *Scout Plate Prior to the First Operation.*

The shadow of the stone, while definite, was faint and would have been lost on reduction; hence it has been marked. Several loops of dilated small bowel overlie the third lumbar vertebra.

For 2½ months the patient did very well and resumed the care of her 99-year-old mother. On June 15 she noticed a sudden loss of appetite and felt somewhat nauseated but did not vomit. She had very mild pain in the right paraumbilical region. On the same day she had four or five watery bowel movements but no vomiting. I examined her on the 2nd day of this illness because of persistent nausea, mild upper-abdominal cramps and diarrhea. There was some slight distention but no spasm or tenderness. A few high-pitched, metallic, peristaltic sounds were audible over the right side of the abdomen. It seemed clear that the patient had partial intestinal obstruction, probably due to adhesions rather than to a second impacted gallstone, since three gallstones had presumably been already accounted for.

At any rate, the patient refused to be hospitalized until the following day, by which time she had vomited once. The abdominal examination was less definite than at the first entry. There was no definite distention. There

was no muscle spasm and only slight tenderness in the right para-umbilical region. The patient was in better general physical condition than at first entry. The blood pressure was 126/80. There was no apparent acidosis or dehydration. The white-cell count was 8000; the values for blood chemical constituents were normal. A scout plate of the abdomen revealed a few somewhat dilated loops of small bowel. Gas was present in the large intestine; it was apparent that the obstruction was not complete. The patient was unwilling to be operated on and was having daily liquid dejections. Accordingly a Miller-Abbott tube was inserted into the stomach and decompression attempted. This was only partly successful because the balloon broke. Administration of 100 per cent oxygen was poorly tolerated, and during a 12-hour period the girth of the abdomen increased from 102 to 105 cm. The patient vomited when the duodenal tube was clamped, and commenced to have slight rebound tenderness to the right of the umbilicus. A check scout plate showed a slightly increased amount of gas in the small bowel and also in the large bowel.

Finally, after 3 days of decompression and fluid therapy, a second laparotomy was done under spinal anesthesia. Another impacted gallstone was removed some distance from the site of the first stone. An omental graft was placed over the bowel wound to minimize adhesions and kinking.

The patient had a stormy convalescence but was finally discharged on the 22nd postoperative day. She had ileus requiring gastric drainage for 15 days. There was also major wound sepsis with profuse, purulent discharge and infection at the fascial level. It was thought that this infection might have been avoided by the use of a cellophane-lined pad, as advocated by Lahey.[6] It was noteworthy that during convalescence, until 2 days prior to discharge, the patient continued to pass stools which were very light in color, although she had no jaundice and the stools were well formed. The explanation of this lessened amount of bile was not evident.

Six months later the patient was symptom-free and was performing her usual duties. The operative scar was solid.

Intestinal obstruction is a common condition. The frequency of gallstone ileus is best stated in terms of its incidence in relation to all cases of intestinal obstruction. Thus Bennett[7] found 28 examples of gallstone ileus in 3064 cases of intestinal obstruction, an incidence of less than 1 per cent. Balch[8] tabulated 10 cases (2 per cent) of 502 obstructions seen at the Massachusetts General Hospital. It suffices to say that of all cases of intestinal obstruction, from 1 to 2 per cent are due to gallstones. A characteristic feature of gallstone obstruction is clearly demonstrated by the fact that many of the reported cases presented a picture of nonsurgical obstruction of a temporary or incomplete nature, with disappearance of symptoms after the passage of the gallstone by anus. Thus in Wagner's[9] total of 334 cases, 93 patients rid themselves of the cause of their obstruction by defecation of the offending stone. However, if surgical intervention is delayed, in the hope that such a favorable outcome may result from nonsurgical measures, an already formidable mortality rate will become even greater. It is important, nevertheless, to bear in mind that this is an obturation type of obstruction. Hence, in a number of cases the cure is spontaneous. Often such episodes occur in patients who do not consult a physician at the time.

Age

One of the reasons for the high mortality is that the condition occurs chiefly in people of advanced years. In Balch's series the average age was sixty-six. Wortmann[10] reports its occurrence in a twenty-five-year-old woman. Dulin and Peterson[11] had a patient of eighty-three who survived operation.

Sex

All observers have been unanimous in finding a much higher incidence in women, out of proportion to the more frequent occurrence of gallstones in women. The ratio is about 5:1.

Mortality

The mortality rates in the literature vary more widely than the figures on any other phase of the subject. Moller[12] had an 89 per cent mortality in 22 cases; his group of cases is one of the largest on record. The figure given by Grey-Turner[13] is extraordinarily good, with 8 recoveries out of 10 private cases. The average figure is around 50 per cent, and this is the mortality rate in the 10 cases seen at the Salem Hospital.

Mechanism of Obstruction

Practically all gallstones that cause intestinal obstruction make their way into the intestinal tract through a cholecystoenteric fistula. The first and second portions of the duodenum are the commonest sites of entry. In a rare case, the stone may pass into the duodenum through a tremendously dilated common duct, or a fistula may occur between the common duct and the duodenum. Thompson[14] has tabulated 10 cases of duodenal obstruction from stones lodged partly in the gall bladder and partly in the duodenum. The stomach or other portions of the bowel may be the site of the fistula. Surgical oddities are those fistulas emptying into the pleural or pericardial cavity, pelvis of kidney, gravid uterus and so forth. Vomiting of gallstones has occurred a number of times.

Barnard[15] states that stones less than 2.5 cm. in diameter are passed spontaneously. Gutmann[16] estimates that 50 per cent of stones ulcerating into the bowel cause obstruction. Many factors in addition to the size of the stone influence the occurrence of obstruction. Since this is an obturation type of obstruction, the block may occur at any point from the entrance of the fistula into the intestine to the anal canal. Cases have been reported in all portions of the bowel. The

commonest site is naturally the ileum since this is the narrowest portion.

Many coincident factors have a bearing on whether or not obstruction occurs. Enlargement of a stone during its passage, kinks in the bowel because of adhesions, the presence of a Meckel's diverticulum, a slow rate of peristalsis or localized spasm of the bowel wall brought about by the gallstone may precipitate obstruction in some cases where the stone is borderline in size. In the present case, the first obstruction was caused by a stone the diameter and weight of which were less than those of a previously defecated one.

Thus, as the stone makes its way along the intestinal tract, there may be one or more episodes of partial, temporary obstruction before its final arrest. The obstruction is rarely complete; hence a marked degree of distention is not present. Since at the outset the block is merely mechanical, bowel circulation is rarely jeopardized. Therefore, tenderness is minimal unless a complicating peritonitis is present.

Size of Stone

Stones large enough to occlude the intestinal lumen are usually the size of a walnut, according to Wangensteen.[17] The largest recorded stone was removed successfully from the transverse colon of an eighty-one-year-old man by Grey-Turner, and measured 7.0 by 6.0 by 17.0 cm. In our case, the defecated stone measured 3.2 by 3.0 by 2.0 cm. and weighed 13.2 gm. While the first obstructing stone measured 3.0 by 3.0 by 3.1 cm. and weighed 12.7 gm., the second one measured 3.2 by 3.2 by 2.9 cm. and weighed 19.0 gm. Wangensteen emphasizes the role of spastic obstruction by calling attention to a stone which was so small that it weighed less than 4 gm., yet caused fatal obstruction. Borman and Rigler[18] report a fatal ileus due to a stone measuring 2.8 by 1.8 cm.

Symptoms

In the majority of cases the preoperative diagnosis is intestinal obstruction. In 10 cases recently reported by Wakefield, Vickers and Walters,[19] of the Mayo Clinic, the specific type of obstruction was not diagnosed preoperatively in any case. Thus the paramount symptoms are simply those of obstructed bowel, that is, pain, vomiting and obstipation.

However, the symptomatology of gallstone ileus is unusually variable and misleading because of the mechanism of the obstruction. In the majority of patients, a history of previous biliary-tract complaints is elicited. Such complaints vary from chronic dyspepsia and belching to repeated attacks of biliary colic, or cholecystitis with pain in the right upper quadrant of the abdomen, nausea and vomiting. These are symptoms which precede the extrusion of the stones into the intestinal tract. It has been suggested that fewer cases of gallstone ileus will be encountered in the future, because there will be fewer chronically inflamed gall bladders left in the body to form adhesions and later fistulous connections with adjacent organs.

When the stone passes into the intestine, the event may be signalized by a definite bout of severe upper-abdominal pain and vomiting, which subsides after a few days. On the other hand, the transit may be unaccompanied by symptoms.

Once in the intestine, the stone characteristically causes cramps as it makes its downward passage. In many cases, prior to the final obstruction which necessitates surgery, there will have been one or more episodes of varying degrees of obstruction, manifested by intense cramps together with vomiting and obstipation. Because of ball-valve action and increasing peristalsis, the temporary halt is overcome, symptoms subside, and progress is resumed until the lower ileum is reached, wherein complete, persisting obstruction often ensues. In the present case, the first symptoms were those of colic, slight distention and tenderness in the left lower quadrant, so that a diagnosis of diverticulitis with spasm was suggested. After a barium enema, a faceted gallstone was passed by anus. During the next two weeks the patient experienced intermittent colic, which ceased after the expulsion of the second stone, only to be followed by a complete obstruction of the small bowel from a third stone, the diameter of which was no greater than that of the first.

Even when the final obstructing point is reached, the symptoms are not so pronounced as those in other types of obstruction. A number of authors[15, 20–22] comment on the lack of distention, indicating that at least some gas is able to pass the stone. Nor is tenderness a common finding. A mass can be palpated infrequently. Powers[23] believes that tenderness beneath the right costal margin suggests a diagnosis of gallstone ileus.

Thus, another reason for the high mortality is found in the equivocal character of the premonitory symptoms and the actual ileus. Frequently elderly patients are hospitalized only after many days of obstructive symptoms.

Diagnosis

The diagnosis in most cases is intestinal obstruction, the cause being undetermined. The abdominal flat x-ray plate occasionally reveals an intraluminal shadow which suggests a gallstone.

Lowman and Wissing[20] state that an x-ray diagnosis of gallstone ileus has been made only eleven times. In the present case a definite preoperative diagnosis was made prior to the first jejunotomy, but only a questionable shadow could be seen on the flat plate before the second operation. In an elderly patient who gives a history of previous gall-bladder disease, often with repeated episodes, the occurrence of a nonfulminating or recurrent obstructive syndrome, with perhaps a shifting focus of symptoms, suggests ileus caused by a gallstone. However, it is not particularly pertinent to the patient's welfare that an exact diagnosis of the nature of the obstruction be made. The important thing is to make a diagnosis of obstruction.

Treatment

Operation should be performed as soon as it is apparent that the progress of the stone has been arrested and that more or less complete obstruction of the bowel exists. In reviewing a great many case histories, one is struck by the number of patients who had mild obstructive symptoms, relieved by the passage of a stone or stones by anus. It is apparent that the vast majority suffered intestinal colic but not a frank obstruction, although the condition was reported as gallstone ileus. Such colic is set up partly by the obturating action of small stones, but also because of spasm due to irritation provoked by their passage. Wangensteen[17] mentions 2 patients with small stones and some degree of spastic obstruction who were treated with inlying duodenal tube suction, with later appearance of the gallstones in the stools. The distinction between intestinal colic and obstruction is well illustrated by the present case. The patient suffered colic with both defecated stones, but had no nausea, vomiting, distention or obstipation.

When a patient is having mild cramps, perhaps in varying locations, unaccompanied by vomiting and distention, he may be safely observed for a period during which bed rest, antispasmodics and a liquid diet can be instituted, while the abdomen is studied by x-ray and repeated examinations. In Murphy's[24] 125 cases, 70 passed the stone by anus.

However, immediate surgery is indicated if a diagnosis of intestinal obstruction is made. Suction decompression, as an adjunct to immediate surgery, is very useful. Its employment in lieu of immediate surgery, in the hope that a spastic obstruction may be relieved and the stone defecated, is a dangerous practice.

An enterotomy, without enterostomy or drainage of the abdomen, is the operation of choice. When possible the obstructing stone should be milked upward a short distance, so that the opening in the bowel is not made at the point of incarceration, where wound-healing might logically be poor. The longitudinal incision may be closed transversely by an inverting type of suture, followed by a continuous Cushing stitch and completed by a series of interrupted mattress sutures.

Adhesions and kinking of the bowel may be minimized by tacking a free omental graft over the suture line with a few interrupted sutures. An enterostomy adds very definitely to the operative risk and is rarely necessary. Wangensteen mentions that it is occasionally possible to crush a stone within the lumen. However, Dulin and Peterson[11] report such an attempt in which the trauma to the bowel necessitated anastomosis between the ileum and cecum.

The possibility of multiple stones must be kept in mind at the time of operation. In 3 of Holz's[2] series of 5 cases of repeated operation for gallstone ileus, the second stone had to be removed during the immediate convalescence. It is probable that the second stone was already in the intestine at the time of the first operation. A great many surgeons[19, 25–27] have reported the finding of more than one stone within the intestine, often close together but occasionally separated by considerable distance. The presence of facets on the obstructing stone indicates the need for additional search, provided the patient's condition permits. Both the proximal intestine and the biliary tract should be palpated. The detection of stones within the gall bladder may be very difficult, owing to dense adhesions. Additional stones within the intestine can often be removed through a single incision. However, if a second stone is felt within the gall bladder, it is rarely feasible to remove it at the same operation, although Holz successfully removed the gall bladder and closed the cholecystoduodenal fistula after doing an enterotomy for the first stone. In the case reported here, the stone removed at the first operation had one facet which did not fit either of the two facets of the previously defecated stone, but it was assumed that a third stone lost by defecation was the explanation. However, this facet was later accounted for by the facets on a fourth, unsuspected stone which had to be removed three months later, and which was presumably still in the gall bladder at the time of the first operation.

Summary

A case of recurrent gallstone ileus is reported.

Gallstone ileus occurs typically in elderly women with a previous history of chronic gall-bladder

disease. It is worthy of emphasis that this is an obturation type of obstruction.

The high mortality, 50 per cent, is chiefly the result of the advanced age of the patients and delay in operating on them. This delay is largely due to the variable, somewhat atypical obstructive symptoms.

Immediate surgery is imperative once the diagnosis of obstruction is made. However, the patient may be given a reasonable chance to pass the stone by anus if the distinction between colic and obstruction can be made. Vomiting, obstipation, persistent colic, distention, hyperperistalsis and the typical appearance on the flat x-ray plate are features that indicate obstruction requiring surgery.

The stone may occasionally be visualized on x-ray examination.

The Miller–Abbott tube and 100 per cent oxygen inhalations appear to be valuable implements to surgery in such conditions, in addition to spinal anesthesia and the correction of fluid and chemical deficits.

An enterostomy is usually unnecessary. The possibility of multiple stones must be kept in mind at the time of the operation. It will rarely be desirable to carry out any surgical procedure in regard to the cholecystoenteric fistula.

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REPORT ON MEDICAL PROGRESS

ATHLETIC AND RELATED INJURIES

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REFERENCES to athletic trauma in the medical literature are relatively scarce, and the injuries are in many cases indexed under other diagnoses. Traumas produced by athletic activity, whether organized or recreational, are often similar to certain types of injuries received in industrial accidents. It would be a mistake not at least to mention some of the physiological aspects of muscular metabolism, as this field is important and as new developments are constantly appearing. Fractures as such will be considered only incidentally. In addition to the physiological aspects of muscular metabolism, this report will discuss the commoner types of injuries: sprains and strains of the extremities, injuries to the back, internal injuries and head injuries.

PHYSIOLOGY OF MUSCULAR EXERCISE

Much interest in the physiology of muscular exercise has recently been manifested, but one still finds a relative scarcity of reference to the subject in the literature. Foster[1] has analyzed the direct effect of extreme physical exertion on the kidneys, and concludes that certain changes are apparent in the appearance of urine specimens before and after exercise. Abrahams[2] concludes that every test involving blood pressure in prolonged physical exertion is fallacious because of the emotional factor, and suggests that observation of the rate of cardiac deceleration would furnish a more satisfactory method. Similarly, Kellner,[3] having investigated the observations made by Farris, concludes that the excitement of examination does not cause any essential morphologic change in the white-cell count. And Nylin[4] demonstrates the practical applicability of the cardiopulmonary function test. But although these tests constitute attempts to standardize the measure of physical fitness, they have not yet been generally accepted as conclusive. The high blood pressure in an occasional young athlete is still an unexplained physiologic phenomenon.[5]

There appears to be little if any demonstrable basis for the claim that gelatin is valuable in combating fatigue. The conclusions of the Long Island College of Medicine report[6] are now being investigated by a series of experiments at the Harvard Fatigue Laboratory. However, the comment of the Council on Foods of the American Medical Association[7] seems of sufficient significance to bear quotation:

> The experiments of Ray and his associates cannot be considered as conclusive. They represent uncontrolled observations, because no comparisons were made of the effect of feeding other proteins or other substances. . . . Perhaps the chief point of criticism about the work performed . . . is that the feeling of fatigue was the criterion for stopping work each day. It is well known that the mental factor in fatigue is enormous, and some method of controlling this factor could well have been included in the planning of the experiments. On the basis of available evidence the Council cannot recognize the claim that gelatin lessens or postpones fatigue.

SPRAINS AND STRAINS

Knee

The literature on sprains and strains of the knee seems to be fairly full. In another place I[8] have pointed out the large and increasing field of lesser but important trauma in sports and recreation and discussed the incidence of knee injuries in sports, with particular emphasis on the low incidence of internal derangements — less than 10 per cent of the 483 cases involved — attributable to treatment and especially to subsequent prophylactic treatment. Efskind[9] reports operations performed between 1928 and 1936 for injury to the semilunar cartilage in 36 patients, with all but 2 cases followed. In 13 cases the author observed diminution in the joint space where the cartilage had been removed and abnormal static changes in the articular cartilage, with no change in the knee not operated on. All but 20 of the patients returned to their regular work. Hopkins and Huston,[10] analyzing the end results of a series of 193 injuries to the knee out of a total of 259 major knee injuries sustained at Springfield College between 1924 and 1937, report that 89 per cent of the cases of simple synovitis and 81 per cent of those with a lateral ligament sprain showed good final results, all the patients being able to participate actively in athletics. The authors state that the results of semilunar cartilage injury treated by immobilization (46 per cent good) were suffi-

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ciently better than those treated merely by bandaging, rest, crutches and physiotherapy (36 per cent good) to warrant the use of a plaster cast as soon as a diagnosis had been made. They conclude, "The results of conservative treatment are so satisfactory, nearly half being good, that we believe it should be tried in nearly all cases before resorting to operation." It is interesting to note that football was responsible for 90 cases (47 per cent), soccer for 24 (12 per cent), basketball and gymnasium for 16 (8 per cent) each, track for 10 (5 per cent), wrestling for 9 (5 per cent), baseball and lacrosse for 6 (3 per cent) each, and various other activities for 16 (8 per cent).

Milbourn,[11] in discussing 9 cases verified by operation, maintains that after injection of an opaque substance (Abrodil or Intron) the only roentgenological sign of concentric injury to the meniscus is that the triangular contrast defect at the site of the ruptured meniscus is much smaller than that of the other meniscus. He suggests that the sign of concentric meniscal injury generally occurs together with other signs in the arthrogram which indicate meniscal injuries.

Lambrinudi[12] reported to the Section of Orthopaedics of the Royal Society of Medicine 8 cases of injuries to both semilunar cartilages seen in two years, and stated that dual lesions of the semilunar cartilages occur more frequently than is realized, and ought to be suspected in all cases where the pain, associated with an injury to the external cartilage, is referred to the inner side. Dislocation of the external cartilage is more frequently associated with strain of the crucial ligaments than is the case with internal cartilages. The degree of ligamentous laxity and its symptoms were believed to be due more to slipping in and out of the external cartilage than to laxity itself; the author remarked that in such circumstances excision of the cartilage is a sound procedure.

Shoulder and Upper Arm

Gilcreest and Albi[13] have discussed the histology of injuries in the region of the deltoid muscle, citing the report and tabulation by Bunts[14] of 19 cases of isolated injury to the circumflex nerve, of which 8 were the result of dislocation and 7 of contusion, Clemens's[15] report of a case of traumatic hernia of the deltoid muscle, Davis's[16] report of a case of detachment of the deltoid from its bony origin, and the observations by Smith and Christensen[17] that no explanation of the mechanism of production of paralysis of the deltoid can be found in the literature, their report of 2 cases of paralysis following shoulder injuries, and their conclusion that common shoulder injuries may result in a complete and permanent paralysis of the deltoid muscle. Gilcreest and Albi state that deltoid injuries must be repaired as soon as possible, and prescribe the wearing of an abduction splint at an angle of 90° in a slightly forward position for three or four weeks, with heat and gentle massage for about one week after the repair, followed by passive abduction of the shoulder by stooping exercises. They also recommend treatment ranging from the usual neuritis treatment to neurolysis or neurorrhaphy for the restoration of the continuity of injured nerves, and transplantation of the pectoralis and other plastic operations in cases of severe atrophy of the deltoid muscle. For rupture of the serratus magnus (anterior) muscle, they state that if the nerve is involved, early recognition of the extent of the lesion, the nutritional state of the paralyzed muscle and the extent of secondary changes in the antagonists are all factors in the prognosis, with surgical intervention indicated if the muscle cannot be stimulated to react to faradic or galvanic currents. They comment on 3 cases of subscapularis-muscle lesions and remark that no cases of this injury could be found in the literature. Also they could find in the literature no cases of rupture of the coracobrachialis muscle, but report 1 case, due to direct violence, in which an early operation resulted in complete recovery. In addition to the 10 cases of triceps-muscle lesions found in the literature, Gilcreest and Albi report 3 cases, with the comment that early exploration and repair usually achieve a complete restoration. Attrition due to occupation, degenerative changes caused by senility, arthritis, myositis, arteriosclerosis, acute and chronic infectious diseases, fatigue and trauma are all cited as factors in rupture of the biceps muscle, with early diagnosis and repair important in obtaining a complete restoration of function. Surgical repair is prescribed for elongation and dislocation of the tendon of the long head of the biceps muscle.

Kaplan[18] reports 5 cases of thrombosis of the axillary vein at Bellevue Hospital, and recommends rest, elevation and hot, moist packs applied locally, with a hand-to-shoulder elastic bandage for residual edema. Excision of the thrombus or entire segment of thrombosed vein has been recommended by others, but Kaplan states that the advisability of such procedures is questionable.

Wrist and Ankle

Cave[19] discusses the pathology of fracture of the carpal navicular bone, its diagnosis and treatment, and those who are interested should read

his article. The rare incidence of fractures of the carpus — approximately 2 per cent of all fractures, according to a review of 4500 cases at the Massachusetts General Hospital — is of interest. Woods[20] outlines the various types and treatment of fractures of the wrist and ankle. As a treatment for radiocarpal dislocations, he prescribes reduction by traction and immobilization in a standard cast for fourteen days, followed by strapping with a layer of plaster bandages reinforced by a few strips of Paragon Plaster with interlocking split tails. For inferior radioulnar dislocations, usually a complication of a severe Colles's fracture, Woods recommends reduction under anesthesia by pressure and manipulation, fixation for three or four weeks in a standard cast and strapping support until all symptoms have disappeared. He states that massage and passive movements are contraindicated for sprains of the wrist joint, the preferred treatment being immobilization in a non-padded dorsal splint of plaster of Paris for ten to twenty days. He recommends radiography for all dislocations of the ankle joint, because of the probability of associated fractures; treatment should consist of reduction under local or general anesthesia, followed by immobilization in a standard below-the-knee cast for ten days. For incomplete dislocation of the astragalus, reduction by traction and manipulation, with the knee flexed, followed by a plaster cast, are indicated, while for complete dislocation, screw traction or open operation when necessary, with astragalectomy and fixation in a plaster cast in extreme cases, is recommended. The author stresses the usually unfavorable prognosis in these injuries. Subastragaloid dislocation, whether posteromedial or posterolateral, requires prompt treatment with x-ray films of the foot and reduction under anesthesia, screw traction when necessary and a "walking" plaster cast for four to six weeks. According to Woods, the treatment of extra-articular sprains of the ankle — after x-ray examination has ruled out the possibility of fracture — should consist of a 5-cm. strip of Paragon Plaster applied as a stirrup, a horizontal strip with its lower border level with the tip of the external malleolus, and with the tails of the strip wrapped alternately round the ankle, and daily massage for the leg muscles; the patient is directed to walk as naturally as possible. Application of Scott's ointment, massage, contrast baths (hot and cold) and radiant heat for severe cases are recommended for sprains with severe synovial involvement, with carefully selected and limited exercises.

Bunnell,[21] discussing the primary repair of severed tendons, states that such repair should be attempted only under strict indications covering the nature of the wound and adequate surgical and hospital facilities. He recommends prompt operation, thorough debridement and the closing over of all vulnerable parts. The tendon stitch should be simple and of non-irritating material, preferably stainless steel wire, and may be left in the tendon or placed in such a way that the wire is removable.

Hamstring Muscles

Girard and Childress[22] report an injury to the hamstring muscle of the left thigh, sustained in football practice, and state that the formation of the fibrous tissue is inevitable in the repair of severe muscle tears, treated either conservatively or surgically. The resulting fibrous mass should be given consideration in its relation to adjacent nerves and vessels. Further efforts to repair the muscle in this particular case, the authors contend, would undoubtedly have produced additional scar tissue, with a recurrence of the nerve-pressure symptoms. They observe that an excellent functional and cosmetic result has been obtained by complete excision of the semitendinosus muscle.

Injuries to the Back

Lumbosacral and Sacroiliac Strain

In a review of 150 cases, Gilcreest[23] attributes lumbosacral and sacroiliac strain to posture, trauma, infection, congenital anomalies and neurologic, metabolic and neoplastic conditions, with arthritis of no significance. He states that a very careful history and thorough examination are of the utmost importance in early diagnosis of this condition, in which roentgenograms are of little aid, and recommends early treatment by manipulation and a belt if necessary. Ten of the 150 cases were treated with a plaster-of-Paris body encasement. The majority of patients were in middle life, the youngest was nineteen and the oldest eighty, and the condition occurred oftenest in strong, robust, muscular individuals. Gilcreest comments on the difficulty presented by the frequent complaint of this condition among malingerers.

Rupture of the Intervertebral Disk

An earlier progress report[24] has discussed rupture of the intervertebral disk and has pointed to the importance of an early neurological examination, accompanied by lumbar puncture in the treatment of patients with chronic back pain and pain referred to the lower extremities. Testing of the reflexes of the patients is a part of this examination.

Internal Injuries

Contusion of the Kidney

Prather[25] discusses the pathological signs of contusion of the kidney, as well as the treatment, and points out that there was no evidence of shock in 90 per cent of the cases reported, that no fall of blood pressure was noticed during the first forty-eight hours of hospitalization and that no rise of increase in tenderness and spasm for the first forty-eight hours of hospitalization was apparent. A conservative, nonsurgical program was pursued. He also reports 8 cases of true rupture of the kidneys, with 4 successful operations and 2 deaths. Traumatic severance of the renal pedicle, he states, invariably causes the death of the patient, but fortunately the condition is rare.

Rupture of the Spleen

Webb[26] expresses his belief that traumatic rupture of the spleen occurs more frequently than a review of the literature reveals, and emphasizes the necessity of bearing this condition in mind in all injuries to the splenic area, and of keeping all suspected injuries under observation for at least fourteen days. Diagnosis is aided by a roentgenological examination, and the treatment indicated is splenectomy; Webb cites a case of a successful splenectomy on an eight-year-old boy who was injured by a puck while watching a hockey game. Physiologic and pathologic conditions make conservative measures extremely hazardous, the author states, although spontaneous healing and recovery occasionally occur. Foster and Prey[27] have analyzed 20 cases of splenic rupture operated on in four Denver hospitals from 1927 to 1938. They state that correct diagnosis is not made frequently enough or early enough, and give as two especially important diagnostic signs localized abdominal rigidity and shifting dullness. Preoperative transfusion and autotransfusion are often life-saving procedures but have not generally received proper recognition. The authors recommend splenectomy as the usual treatment, with suture indicated only in cases with small lacerations due to gunshot or stab wounds; tamponade should be resorted to only when any other type of surgery would undoubtedly cause death.

Rupture of the Bladder

Thompson[28] observes that traumatic rupture of the bladder, because of the increasing number of automobile accidents, is now being encountered oftener, although the condition is still considered comparatively rare. A discouraging fact about such ruptures is the extremely high mortality rate — about 80 per cent of both intraperitoneal and extraperitoneal types, two thirds of the cases being intraperitoneal. Surgical treatment is indicated and should be carried out as soon as possible. The author remarks that 90 per cent of such injuries occur in men, with alcoholism as a frequent contributing factor.

Rupture of the Duodenum

Among the more serious visceral injuries, traumatic rupture of the duodenum or of the retroperitoneal duodenum occurs very rarely but is usually fatal. Ottenheimer and Gilman[29] attribute the high mortality accompanying such ruptures to three factors: failure to make a diagnosis sufficiently early to render proper treatment effective; failure to recognize the condition at operation; and technical difficulties encountered in repairing the retroperitoneal duodenum and establishing adequate drainage of the retroperitoneal space. They observe that the discovery of gas in the retroperitoneal space, either preoperatively or at operation, is almost pathognomonic of the condition, and that radiographic films are indicated in all cases where a ruptured retroperitoneal duodenum is suspected.

Traumatic Appendicitis

Kessler[30] states that traumatic appendicitis rarely occurs, and that such a diagnosis should be accepted only when no symptoms or signs of appendicitis have existed before the accident and when severe injury of the abdomen or overexertion can be proved. An interval of two or three days without symptoms and full ability to work, he further observes, makes the asserted relation improbable.

Riedl[31] reports a case of an unusual injury sustained in football: a rupture of the gastrocolic ligament, with consequent peritoneal hemorrhage. A successful operation was performed, and was followed by recovery.

Chest Injuries

A recent study[32] demonstrates that spontaneous pneumothorax occurs more commonly than is generally supposed. The author of the study further states that this condition not only occurs in the apparently healthy but is usually characterized by an afebrile benign course with recovery in a few weeks. The incidence of the condition among college students is fairly high, 15 cases being reported in an average male student body of 2500. The causes may vary from laughing and coughing to straining and running, but undue physical exertion is not necessarily a contributory factor. The treatment recommended is rest for at least a week after onset. It is perhaps pertinent to

remark that only 1 case of spontaneous pneumothorax — and that was caused by running — has been observed in organized athletics at Harvard University for the last eight years. Discussing the surgical treatment of chest injuries, Hegner[33] outlines the signs and symptoms, the treatment and the mortality rate accompanying such injuries; x-ray visualization is indicated after the patient has recovered from shock. Aspiration of as much blood as possible is recommended for all serious lung hemorrhages.

Head Injuries

An editorial in the *Journal of the American Medical Association*[34] mentions two dominating influences in the treatment of traumatic brain injuries in recent years: the demonstration of the four classic stages of brain compression by Kocher and Cushing, and the observation of Weed and his collaborators that increased intercranial tension can be influenced by changing the osmotic pressure of the blood by the giving of hypertonic or hypotonic solutions. Reports in recent years show that more attention is steadily being paid to differentiation in diagnosis of head injuries and to the effect of the treatment on the patient's life after recovery. Thus Schaller[35] differentiates between the post-traumatic concussion state and the post-traumatic psychoneurotic state. The former condition produces reversible changes of function of the brain, which in severe cases may become irreversible, the symptoms being headaches, vertigo, tinnitus, nervousness, impairment of memory and of vision, fatigability, poor concentration, sensitiveness to heat and intolerance to alcohol. The latter state, on the other hand, is characterized by fear, suggestion and wishful thinking, and is caused by the precipitation of psychic complexes, following a period of mediation in patients presenting inadequate personality traits and subjected to adverse mental influences. The author expresses the conviction that every post-traumatic neurotic person of the hysterical type is at least a subconscious simulator, while many are malingerers, and states that treatment must be prescribed with this fact in mind.

Another study of head injuries by King[36] places the patients in three categories: those who will recover with little treatment, those whose prognosis is uncertain and those who will probably die. Dehydration and lumbar puncture are recommended. The author considers lacerations of the scalp, depressed comminuted fractures of the skull vault, fissured fractures of the base and compound fissured fractures of the vault, and describes the treatment of these various injuries. The same writer[37] states elsewhere that traumatic osteomyelitis is really not osteomyelitis but bone necrosis, caused by bone denudation in the presence of local infection. In another discussion of brain abscesses observed from 1920 to 1939, he[38] notes that 7 cases out of a total of 60 were of traumatic origin, and all were males between the ages of seven and fifty-four. All were operated on, and all made uneventful recoveries. These abscesses due to trauma, King points out, may be large or small, superficial or deep; they are usually irregular in shape and in 90 per cent of the cases are single. Preservation of life, removal of the pus with subsidence of brain edema and healing of the wound with recovery and return to normal life are cited as the main objectives of the procedure. Prompt removal of the cranial or extracranial source of infection is the operative procedure recommended.

With reference to the convalescent care of patients suffering from craniocerebral injuries, Munro[39] states that the convalescence should be planned so as to correlate the patient's needs with the injury and the resulting pathologic lesion, the preconvalescent period varying from seconds, in properly diagnosed cases, to years in neglected cases of subdural hematoma that have been incorrectly diagnosed as skull fracture. The convalescence begins after the patient has had a constantly normal intracranial pressure for two weeks, and must not only provide directions as to physical activity but embody in them enough applied psychology to prevent the patient from interfering with his own recovery. The convalescent care, moreover, should include plans to keep the associated destruction of initiative and self-confidence from developing into a permanent neurosis.

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It is interesting to note, in connection with injuries sustained in recreation, that in 1939 there were 13 deaths — 5 fewer than in 1938 — directly due to Fourth of July celebrations, and that cases of tetanus, burns and lacerations, loss of vision or injury to the eye, internal injuries, fractures, mutilations and other serious accidents were correspondingly fewer.[40] The reduction in the number of serious injuries from fireworks may be directly attributed to the effectiveness of more adequate legislation and general education of the lay public.

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CASE RECORDS OF THE MASSACHUSETTS GENERAL HOSPITAL

ANTEMORTEM AND POSTMORTEM RECORDS AS USED IN WEEKLY CLINICOPATHOLOGICAL EXERCISES

FOUNDED BY RICHARD C. CABOT

TRACY B. MALLORY, M.D., *Editor*

CASE 26311

PRESENTATION OF CASE

A twelve-year-old boy, since the age of two years, had been observed and followed extensively in an outside hospital because of heart trouble. The birth history was not remarkable. The child received adequate vitamins and gained well during infancy; he had had bronchial pneumonia at the age of seven months, and since that time had experienced frequent colds, with noisy breathing. Physical examination at the age of two revealed a rather pale, under-developed infant with prominent frontal bossing. Examination of the heart showed marked enlargement to the left, a palpable systolic thrill over the precordium, and a loud, rough systolic murmur heard over the whole precordium and transmitted to the neck. Roentgenograms of the chest confirmed the cardiac enlargement; there also was evidence of diffuse pulmonary congestion. The child was seen on two occasions in the hospital's heart clinic, and at the age of three was treated in another department for acute cervical adenitis. Because of repeated colds tonsillectomy and adenoidectomy were done at the age of nine; he made an uneventful convalescence. The last visit to the same outside institution, three years before admission to this hospital, was for a routine observation of the patient's cardiac status.

On admission to this hospital it was learned that the patient had always complained of easy fatigability and slight dyspnea on exertion. He had a chronic cough, which had lasted for many years. About one week before admission his mother noted that ankle, scrotal and penile edema had developed. These symptoms slowly progressed, and four days before admission, while at breakfast, he suddenly complained of a severe substernal and epigastric non-radiating pain. His face and eyes allegedly became slightly swollen, and he began to vomit at recurrent intervals until the time of hospital entry. A local physician was called, who immediately gave him nine small green pills, one of which was taken every three hours. Because of emesis, however, he was unable to retain most of them. The urine had become highly colored for the two weeks' interval before admission, and its amount had decreased markedly. The facies had been flushed, and he was forced to sleep on two pillows. No chills, fever, diarrhea, bloody urine, melena or hemoptysis was noted.

In the past he had experienced no childhood diseases such as measles, mumps, whooping cough, chicken pox, diphtheria or scarlet fever. Three siblings and the parents were living and well. The remaining family and past histories were noncontributory.

Physical examination revealed a fairly well-developed and well-nourished boy who appeared moderately ill but who was able to lie flat in bed comfortably, showing but slightly increased respirations. There was a little pitting edema of the lower legs, the scrotum and the sacrum. No clubbing of the fingers but a questionable clubbing of the toes was observed. The face, ears and fingers were flushed, and the eyelids and face appeared slightly edematous. The chest was somewhat enlarged on the left, and both lung bases were full of moist rales. The heart was markedly enlarged to percussion, being 3 cm. beyond the mid-clavicular line in the sixth interspace. In the fourth interspace the heart was enlarged 2 cm. beyond the mid-sternal line on the right. There was a precordial thrill with a to-and-fro, low-pitched almost continuous murmur heard loudest over the fourth and fifth left interspaces, from which it was transmitted to the axilla and back. The apex beat was absolutely irregular at about 100 beats per minute, with a pulse deficit, the radial pulse being 60. The blood pressure was 108 systolic, 60 diastolic. The abdomen was scaphoid; the liver was palpated a fingerbreadth below the costal margin and was markedly tender, and there was a moderate amount of ascites. The remainder of the physical examination was negative.

The temperature was 96.4°F., the pulse at the wrist 55 (taken by a nurse), and the respirations 34.

Examination of the blood showed a red-cell count of 6,000,000 and a white-cell count of 17,000. The urine was negative.

The boy was restless, but not markedly uncomfortable. Shortly after admission he sat up and vomited bile; this seemed to relieve him, but a few minutes later he again attempted to regurgitate and fell backward on the bed. He was found to be pulseless, with slowly dilating pupils. He quickly failed, and died about two hours after admission to the hospital.

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Differential Diagnosis

Dr. Edward F. Bland: It seems to me that this case presents two fundamental problems. First, What were the structural abnormalities in this boy's heart? Second, Why did he die in the course of a week with the signs of acute heart failure, after having been in relatively good condition for twelve years? Ninety-five per cent or more of children of this age in this section of the country who die of heart failure have rheumatic heart disease and active rheumatic fever, and certainly one has to give serious consideration to the possibility that this boy had rheumatic heart disease. I think the evidence is against it, but still we shall have to consider the possibility carefully. Certainly the type of heart failure which he exhibited at the end was consistent and fairly typical of this type of heart disease. The edema had the so-called nephritic distribution frequently seen with heart failure from any cause in childhood. We must assume that auricular fibrillation was present, although in the absence of graphic proof of it, I think we might register some doubt, especially since auricular fibrillation in childhood is relatively rare. We have seen it in patients as young as five years of age who had rheumatic heart disease, and once in an infant of three months with congenital heart disease. If auricular fibrillation is present in childhood it speaks a bit in favor of rheumatic heart disease, since it is even more rare with congenital heart disease. So much for the suggestive evidence of rheumatic disease in this case.

There are certain features which I think are rather strongly against this diagnosis. In the first place we have a record at the age of two that this boy had a cardiac thrill corresponding to a loud precordial systolic murmur. It usually requires a long time for a systolic thrill to develop in a rheumatic heart, and such a finding would certainly be most unusual at the age of two. After all, a thrill with acquired heart disease is dependent on a stenotic valve. However, it is not uncommon at the age of two when associated with a congenitally defective heart. The absence of a rheumatic history is further slight evidence against a rheumatic background. I am inclined to think that he did not have rheumatic heart disease and that he did not die of rheumatic fever.

The second possibility that needs some consideration but is, I think, most unlikely is diffuse pulmonary arterial disease. There have been two such cases in children that I recall in this hospital one of which had a murmur similar in some respects to the description of the murmur here at the later examination; because of this murmur the diagnosis of congenital heart disease was made. At postmortem the case proved to be one of pulmonary-artery disease with thrombosis in the large vessels, marked dilatation of the pulmonary arteries and probably functional regurgitation. The second case had no murmurs in the heart, but the patient died at the age of ten after two years of a slowly progressive downhill course with right-sided failure. In the present case, again the observation at the age of two excluded the possibility that the physical signs in the heart could have been related to pulmonary-artery disease. It takes years for serious heart failure to develop and even longer for the physical signs of such to appear. I do not believe we need seriously consider tumor of the heart or pericardium.

We are left then with the most likely possibility, a congenital defect of the heart or great vessels — perhaps a combination of defects. There are a number of them which are consistent with a fairly normal life and with good functional reserve. I think we can accept the fact that he was not cyanotic. We have no real suggestion of it — only a red-cell count of 6,000,000. He had been vomiting and had congestive failure, and so might have been entitled to a single elevated red-cell count. Furthermore, the clubbing was questionable, and if questionable we had better discard it. The absence of cyanosis eliminates many of the more serious defects. We are left with two or three likely possibilities. The first and most probable is patency of the ductus arteriosus. We know that in some cases the physical signs of such may not be present at birth, as presumably they were not here, but appeared somewhat later and were noted at the age of two. We also know that patency of the ductus may not be associated early in life with a continuous murmur; usually it is, but it need not be. There is one finding that makes me hesitate a little, that is, the enlargement of the heart from the time of the first observation. Ordinarily a patent ductus is very well borne, usually without serious enlargement of either ventricle. In a few unusual cases, for example the six or seven cases that have been operated on in other hospitals in Boston, there is enlargement of the heart of considerable degree. However, all these had a largely patent ductus, with a diastolic pressure of 20 to 30, a Corrigan pulse and a pulsating hilar shadow due to a free reflux of blood from the aorta into the pulmonary artery. I am inclined to think that patent ductus arteriosus is the most likely diagnosis in this patient, but I think that because of the considerable enlargement of the heart it may be complicated by some other defect. It would be very helpful if we had an x-ray film, but I presume

the child died too soon. It would help also if we had an electrocardiogram; but I suppose the same is true of that, so we have to rely on the physical signs.

I am still a little disturbed about the size of the heart. An early x-ray film is reported to have shown diffuse congestion of the lungs. I interpret that as prominent vascular shadows due to a reflux of blood back into the pulmonary circuit through the ductus, but it raises the possibility of septal defect between the auricles, much less likely between the ventricles. The former is quite common with a patent ductus. I think we must assume, however, that the predominant flow of blood was from the systemic to the pulmonary side, at least for the greater part of this boy's life.

What else could he have had? Coarctation of the aorta? The blood-pressure levels do not suggest it, and there is no other reason to suspect it. Sub-aortic stenosis is relatively rare, although we know three patients who we think have this anomaly. They have all the classic signs of aortic stenosis but with an aortic second sound of normal intensity. I think this boy did not have subaortic stenosis, certainly not as the chief lesion. I am relying heavily on the description of the murmur just before he died. I hope that has been accurately described, otherwise I shall be led hopelessly astray. Certainly it is not characteristic of acquired heart disease. A loud murmur, systolic in time, extending into diastole in the left mid-heart and upper heart region, is characteristic of a patent ductus. So much for the structural changes.

Of perhaps more fundamental importance is the second problem; namely, Why did this boy without previous symptoms of serious limitation quickly die in the course of a week with the symptoms and signs of congestive failure? Most children with congenital defects or rheumatic heart disease who succumb in childhood with congestive failure die of some infection. It may be obscure. In those with rheumatic fever, it is usually rheumatic infection. In those with congenital heart disease, it is usually bacterial infection in the heart or in the lungs (pneumonia). If bacterial infection of the ductus existed in this case we should expect the emboli, if there were emboli, to go to the lungs. There is one episode which might be explained in this manner — the sudden acute pain substernally and in the epigastrium four days before he died. That might, however, have been due to acute congestion of the liver. Somewhat against bacterial endarteritis is the fact that the boy had no fever, but after all this is only a single temperature record and it was taken only a short time before he died. It is mentioned several times that he seemed sick and that his face was flushed, and I am inclined to think there must have been a superimposed infection in the heart or nearby. He probably had subacute or acute bacterial endocarditis. If we are correct in the structural defects perhaps the rales in his chest were as much the result of pulmonary emboli or infarction as they were that of congestive failure. It was noted he could lie flat without much discomfort. That does not help since it is characteristic of heart failure in children, which is predominantly of the right-sided type, and hence the lungs may escape serious congestion.

Did he have pericarditis to account for the painful episode? We have no real reason to suspect pericarditis. A friction rub was not heard, the sounds were not masked, and there is no particular reason why he should have had pericarditis. What else, other than infection, could cause this acute heart failure in a child? Acute hemorrhagic nephritis occasionally results in cardiac dilatation and failure, but there is no real reason to suspect it. Undoubtedly he was entitled to have concentrated urine on the basis of heart failure. I am inclined to think we are dealing here with congenital heart disease, probably with auricular fibrillation as the precipitating factor for the congestive failure, possibly with a combination of defects, among which at least one, and most likely the only important one, is patency of the ductus arteriosus, possibly with superimposed bacterial infection and infarction of the lung.

Dr. Eli C. Romberg: With the extremely tender liver, could there be a terminal tricuspid involvement, probably of rheumatic nature?

Dr. Bland: I do not believe so. In all the postmortems in children with rheumatic heart disease that we have seen, if the tricuspid valve is involved, the mitral valve is involved in 100 per cent and the aortic valve in about 70 per cent. We have not yet seen rheumatic tricuspid disease as an isolated finding. I should think occasionally there might be an acute terminal tricuspid involvement, in the course of a septicemia, but I do not believe this child had rheumatic heart disease, either acute or chronic.

Dr. Wyman Richardson: Could you not say that this child had a terminal pulmonary embolus without assuming infection was present?

Dr. Bland: As the cause of the terminal heart failure the last four days?

Dr. Richardson: Yes.

Dr. Bland: Possibly, but probably the heart failure was precipitated by the auricular fibrilla-

tion; that alone could have caused the acute congestion.

DR. TRACY B. MALLORY: Pulmonary embolus is much less common at the age of twelve than at fifty.

DR. BLAND: Pulmonary embolus in children usually occurs only as a reflux from bacterial endocarditis or the endarteritis of a patent ductus. Have you seen it in a child, presumably arising from the peripheral vessels?

DR. MALLORY: I cannot remember such a case.

DR. RICHARDSON: I was thinking of it coming from the auricle.

DR. BLAND: Yes, it is possible if he had auricular fibrillation, and I suppose he did from the description, although the heart rate was relatively slow, possibly due to the nine green pills which he vomited. In a child as sick as this one was, the ventricular rate with auricular fibrillation is ordinarily fast, usually 140 or 150, and difficult to control even with large doses of digitalis. The fact that the child died abruptly need not disturb us particularly. Many children with congestive failure die abruptly.

DR. J. H. MEANS: Might not a child with congenital heart disease develop rheumatic infection?

DR. BLAND: Yes.

DR. MEANS: Have you seen it?

DR. BLAND: Yes, I have, but I found nothing in the description of the physical signs here that would suggest the combination. The mitral valve was not involved. In the absence of physical signs of mitral-valve involvement I hesitate to make that diagnosis.

CLINICAL DIAGNOSES

Congenital heart disease.
Congestive failure.
Auricular fibrillation.

DR. BLAND'S DIAGNOSES

Congenital heart disease: patent ductus arteriosus.
Congestive heart failure (due to auricular fibrillation ?).
Bacterial endarteritis?
Pulmonary infarction?

ANATOMICAL DIAGNOSES

Congenital heart disease: patent ductus arteriosus.
Pulmonary atelectasis.
Anasarca.
Chronic passive congestion.

PATHOLOGICAL DISCUSSION

DR. MALLORY: The autopsy showed, as the single finding concerning the heart, a patent ductus arteriosus. The right ventricle was very markedly hypertrophied, more so than is common with patent ductus arteriosus. There was generalized anasarca, with fluid in the pericardium. There was a moderate amount of pulmonary collapse, no pulmonary embolus, and no evidence at autopsy of any acute infection, so that we can only make a diagnosis of congestive heart failure. The character of the patent ductus was of some interest because now that Dr. Gross* has shown that it can be successfully ligated, we are always in search of suitable cases. In many cases it is a sizable vessel, 3 to 8 mm. in length, long enough so that it is possible to ligate it doubly although not to divide it. Dr. Gross has never been able to divide one, although he hopes to be able to some time. In this case there was no cord at all. The pulmonary artery and aorta were in contact with a simple hole between them. I think it would have been impossible to ligate this "duct."

DR. BLAND: We have to assume that the terminal heart failure was secondary to the cardiac arrhythmia and tachycardia.

CASE 26312

PRESENTATION OF CASE

A sixty-four-year-old, unmarried woman was admitted to the hospital complaining of dyspnea, with precordial chest pain on exertion.

The patient was well until approximately two years before admission, when she began to notice an epigastric "tightness" which occurred following the ingestion of a large meal or following severe exertion. The tightness was described as a pressure sensation which radiated over the precordium and down the inner aspect of both arms to the wrists. It was relieved by rest, as was also a slight but definitely increasing dyspnea with exertion. These symptoms persisted, but she was able to work as a housekeeper until five weeks before admission when she suddenly developed a dull aching precordial chest pain with characteristic arm radiation, which persisted for at least twelve hours without being relieved by rest. Following this attack, breathlessness developed on climbing stairs. She consulted her physician, who prescribed nitroglycerin tablets, which, she stated, relieved the attacks of epigastric and precordial tightness with arm pain, but failed to improve the dyspnea with exertion. She noticed an increasing easy fatigability with slight but definite malaise,

*Gross, R. E.: Surgical approach for ligation of patent ductus arteriosus. *New Eng. J. Med.* 220:510-514, 1939.

and three weeks before entry gave up work. Two weeks before admission the breathlessness was so severe that she was unable to climb stairs, and one week before entry, while en route to visit her physician three blocks from home, she was forced to rest at least three times. She was digitalized by her doctor at this time, with a marked improvement so that she felt "well" and noted a marked decrease in dyspnea with effort. She had experienced no orthopnea, paroxysmal nocturnal dyspnea, ankle edema, cyanosis or other cardiorespiratory symptoms.

The patient had noticed yellow plaques about both eyes for practically her entire life. Similar plaques and yellow deposits elsewhere beneath the skin developed at an early age but she thought little of them, since her mother, her only sister and two of seven brothers had similar nodules. Two of the brothers and the sister had had symptoms of "angina" for years. The remaining family and past histories were non-contributory.

Physical examination revealed a slightly obese woman in no apparent distress. She lay flat in bed without dyspnea. The heart was normal in size, and its rate was 80, with normal rhythm; there were no murmurs. The blood pressure was 115 systolic, 75 diastolic. There were a few fine crepitant rales posteriorly at both lung bases. The abdominal and pelvic examinations were negative. There were large, bright yellow, slightly raised angular plaques about both eyelids. Similar but larger and less yellow nodules were present over both olecranon processes and tibial tuberosities, over the extensor tendons of the middle carpophalangeal joints, and over the middle phalanx of the third right finger. These nodules varied up to 3 cm. in diameter and appeared to be attached to the bony landmarks in their localities. The skin overlying them was smooth, apparently unattached and transmitted a faint yellow hue. The Achilles tendons were bilaterally enlarged, and yellowish deposits were present in both of them. The remaining physical examination was negative.

Examination of the blood showed a red-cell count of 4,800,000 with 100 per cent hemoglobin, and a white-cell count of 5600 with 64 per cent polymorphonuclears; a smear was normal. The urine examination was negative. The blood Hinton test was negative. The blood cholesterol was 285 mg. per 100 cc. An electrocardiogram showed a normal rhythm and a rate of 80, with blurring and widening of the QRS complexes, which equaled 0.10 second in duration; there was left-axis deviation, with diphasic T_1, flat T_2, upright T_3 and small R_1. Two other electrocardiographic tracings showed essentially similar findings.

Roentgenograms of the chest showed that the heart was enlarged in the region of the left ventricle, where it was more rounded than usual. The transverse diameter of the heart was 16.2 cm., while that of the chest was 26.5 cm. There was a little fluid in the left pleural cavity, and by fluoroscopy a smaller amount of fluid was noted in the right pleural cavity. The pulmonary vessels appeared slightly wider than usual. There was calcification of the somewhat tortuous aorta. Films of the hands showed soft-tissue swelling in the middle phalanx of the right fourth finger. Several of the interphalangeal joints showed small subcartilaginous defects. There was another soft-tissue swelling lateral to the base of the right fifth metatarsal. The knee joints showed evidence of deforming arthritis. Anteroposterior views of the elbow joints showed no evidence of disease.

The patient remained in the hospital for eleven days, during which time the temperature, pulse and respirations remained normal. She felt well and could not understand why she was being hospitalized. On the eleventh hospital day, however, at 7:30 p.m. she suddenly gasped, became comatose, developed stertorous breathing and showed a patchy cyanosis, and died within a few minutes. It was observed that the heart ceased beating before the patient stopped breathing.

Differential Diagnosis

Dr. Earle M. Chapman: We are presented with a patient who seems to have died of heart disease, and from the history it sounds as if the patient had had attacks of angina, and that members of her family had angina. In trying to analyze the situation the most significant thing to me is that there was a familial tendency manifested by the patient and others of her relatives not to metabolize cholesterol properly. This family history is very interesting. Knowing that she had had yellow plaques on the skin since a very early age, one guesses immediately that these plaques contained a good deal of cholesterol, that the ones on her eyes were more or less typical so-called "xanthelasma" and that the remainder would be classified as xanthomas (xanthoma tuberosa). I think the x-ray description of the attachment to the periosteum is typical of that condition. There is no mention of neurologic changes, but of course we know they can occur with xanthoma tuberosa. This failure to metabolize cholesterol must have been a factor also in the development of the heart disease.

Why did she metabolize cholesterin improperly? I do not know. She apparently had not suffered from gall-bladder disease, since there is no history of a past attack of gall-bladder colic. We do know that the blood cholesterol was 285 mg. per 100 cc.—the normal range is 150 to 230 mg. Such a definite elevation is oftentimes associated with a low basal metabolic rate, but unfortunately there is no record of the latter. Was it determined?

DR. TRACY B. MALLORY: No.

DR. CHAPMAN: What are the structural possibilities of the heart disease that was present? It seems to me that she probably had plaques of cholesterol, similar to those shown on the external surfaces of the body, located in the coronary arteries. She had had one attack, if you will remember, five weeks before admission, when she suddenly developed a dull aching precordial chest pain with characteristic arm radiation; this persisted for at least twelve hours. The duration of the attack suggests that there might have been a thrombosis or occlusion of the artery, with the formation of a myocardial infarct, at that time. Apparently the course was progressively downward from that point, because it was after this that she consulted a physician and received digitalis, and she died five weeks afterward.

The x-ray findings raise certain questions. Did the plaques of atheroma involve the aortic valve; in other words, did this woman also have calcific aortic stenosis? There is nothing in the physical examination to suggest that. We notice that the heart was normal in size. There were no murmurs. It does not comment whether the aortic second sound was loud, diminished or absent, an observation that might have helped in determining the presence of calcific disease in the aortic valve.

DR. JAMES R. LINGLEY: The film of the chest shows enlargement of the heart, chiefly in the region of the left ventricle. There is calcification in the aortic arch, but no note is made in the record regarding calcification in the aortic valve and it need not show in a film of this quality. The diagnosis must be made by fluoroscopy and confirmed by appropriate films. The films of the hands show this soft-tissue mass on the dorsal aspect of the finger. It is interesting that the density of the mass is the same as that of muscle and that it is not the density of fat.

DR. CHAPMAN: It says that there were subcartilaginous defects.

DR. LINGLEY: The bones of the hands show decalcification and these areas of erosion close to the joints.

DR. CHAPMAN: You do not see anything in the bones of the skull. Xanthomatosis has been associated with the Schüller–Christian syndrome, but I think we can exclude the latter by these skull films.

DR. LINGLEY: In the Schüller–Christian syndrome there are large, round or oval, sharply defined areas of destruction in the skull. The skull in this case appears normal.

DR. CHAPMAN: The report says that there was a small amount of fluid in the left pleural cavity, and by fluoroscopy a small amount in the right pleural cavity. Do you think there was any fluid in the pericardium?

DR. LINGLEY: No.

DR. CHAPMAN: A case of pericardial effusion supposedly due to the presence of cholesterin crystals was reported[1] two years ago in the *American Heart Journal*. Cholesterol crystals were recovered from the pericardial fluid. It occurred to me that that might be the case here, but it seems unlikely.

The electrocardiogram showed evidence of coronary disease, and we know, too, that the patient had received digitalis before entry. These changes probably are not entirely typical of a digitalis effect. To me they are more suggestive of some interference with the conduction system. Widening of the QRS complex and a flat T_2 suggest coronary occlusion.

In trying to summarize the whole situation it seems likely that the patient had a disturbance of cholesterol metabolism. She had plaques of atheroma, and it is possible that she had one in the coronary artery, which five weeks before entry, following spasm of the artery, led to a small infarction of the heart; the findings on entry are consistent with that. Because the heart muscle was able to re-establish itself, she seemed well in the hospital until the terminal episode, when she turned over in bed and died. The artery again went into spasm, and I do not see how we can say that she had a fresh thrombus and a fresh infarct. I think it was spasm due to the old focus five weeks before and that a fresh thrombus and a fresh infarct were not revealed at autopsy. I do not see how we can consider pulmonary infarction or perforation of the heart wall from the old infarction as the cause of death. I think she would have cried out in pain if she had ruptured the heart at the last moment. This process must have involved the conduction system of the heart.

It is interesting that the role of cholesterol in causing arteriosclerosis was not clearly pointed out until the work of Hueck,[2] in 1920, and that of Anitschkow,[3] in 1925, showed that typical changes

in the vessels could be produced in animals by dietary means. One must have cholesterol present in the diet in order to produce these atheromatous changes, as the other lipoids will not cause experimental atheroma. I should have been interested to know what the fundi showed, because certain types of changes occur in the eyes that we now think are associated with this disturbance in cholesterol metabolism.

DR. MALLORY: Have you any comment on the electrocardiogram, Dr. Bland?

DR. EDWARD F. BLAND: Three were taken during the stay in the hospital, and all are abnormal. The T-wave changes are probably a digitalis effect. The QRS complexes are a little slurred and suggest coronary disease, but on surveying the three I note no progressive changes and hence from these alone cannot make a final diagnosis of myocardial infarction.

I recall, but cannot remember the details of the article, a report by a Swedish observer[4] in the *Archives of Internal Medicine* a year ago in which the histories of some seventeen families were given, pointing out a premature appearance of heart disease of the coronary type in people who showed high blood-cholesterol levels and diffuse deposits of xanthoma over the body, some of which were in the heart and internal organs. This case sounds to me very much like the condition that he described, except that he was struck by the premature appearance of coronary disease. I wonder if this case may not be closely related to or perhaps the same as these.

DR. WYMAN RICHARDSON: I should say this patient did quite well. If I live to sixty-four without coronary heart disease I shall be rather proud.

CLINICAL DIAGNOSES

Arteriosclerotic heart disease.
Xanthomatosis.
Coronary thrombosis, acute, recent.

DR. CHAPMAN'S DIAGNOSES

Disturbance of cholesterol metabolism, familial.
Xanthomatosis.
Atheromatous heart disease, with coronary occlusion and myocardial infarction (five weeks old).

ANATOMICAL DIAGNOSES

Xanthomatosis.
Arteriosclerosis.
Coronary thrombosis with infarction of the heart.
Chronic passive congestion.

PATHOLOGICAL DISCUSSION

DR. MALLORY: The postmortem examination showed severe coronary disease, both old and relatively fresh. The main branch of the left coronary artery was reduplicated, one of its branches being completely stenosed with old calcific material; the other was occluded with a fairly fresh, but partially organized, thrombus, quite consistent with five weeks' duration. The left ventricle showed an aneurysmal dilatation, part of which projected anteriorly. The major part of it was in the region of the interventricular septum and projected into the right ventricle; the x-ray had no chance of showing it, since it was in the wrong plane. It was a true intracardiac aneurysm, the sac bulging from one chamber into another chamber of the heart. The other coronary branches were markedly atherosclerotic, as was the aorta. There were several rather large plaques of atheroma in the pulmonary artery, rather more than is usual at the age of sixty-four. I am not able to say, however, that either in the systemic or the pulmonary circulation this atheroma was any more extensive than that which one commonly sees in an individual of this age. As regards the rest of the body, there were very extensive atheromatous deposits in many tendons and in numerous areas of the subcutaneous tissue, as we learned from the physical examination. There were no extravascular deposits within the internal organs.

This disease, if it is a disease, or group of diseases called primary xanthomatosis appears in a number of different forms, and in one of the very characteristic types it is associated with jaundice and with extensive cholesterol deposits in the liver and sometimes in the bile ducts. These were not present here. There were two small yellow nodules in the gall bladder, but very small ones. The other findings were of no particular interest, the ordinary effect of prolonged congestive heart failure.

DR. CHAPMAN: Were the plaques in the coronary artery of this peculiar bright-yellow tint described here?

DR. MALLORY: They were not obviously different from any ordinary atheromatous plaques.

DR. CHAPMAN: Were there no cholesterol studies?

DR. MALLORY: A great deal of material was taken by the Arthritic Service for chemical study; as yet I do not know the results. I think this is the first case of this disease that has been autopsied at this hospital. It is not particularly rare,

however; a familial history is quite characteristic if one looks for it.

DR. RICHARDSON: I should think this case would be an argument against the theory that a high blood-cholesterol level produces coronary disease, because if it were cholesterol that produces these lesions that she had had since childhood, it should be the very case that would have had coronary disease at the age of twenty or thirty.

DR. MALLORY: In the paper that Dr. Bland mentions a number of families were reported in which the average age of onset of coronary disease was significantly low.

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THE CHILD-REFUGEE PROBLEM

The American people have always been noted for their individual generosity and for the spontaneity of their response when aid has been sought for those in trouble. Naturally, this response is elicited most particularly when the disaster is overwhelming, when the need is urgent, and when the circumstances are dramatic. We require only an appeal that stirs our emotions, and our hearts are opened, our purse strings loosened. As a nation that tries to be business-like we are Uncle Shylock; as a group of individuals we heed the first call for help.

Today we are touched as never before, for it is not an act of Nature that has brought tribulation to many millions of people. No earthquake has devastated a community; no river has risen beyond its banks; no hurricane has torn through a populated countryside. This time red-handed man has turned against his neighbors, and home and hearth and family are swept into the area of total war. The appeal is particularly pathetic. The children of a kindred nation are being exposed to the hazards of mechanized barbarianism, and we are asked to save them and to shelter them until they can be returned in peace to their families and homes, if families and homes remain.

Speed would seem to be of the essence, and yet the pitfalls for such a crusade are many if plans are not carefully laid and the emotionalism that governs our actions is not transformed into a calculated activity. We must remember, when we open our hearts and sweep our hearths to receive these English children who have been deprived of the privilege of security, that we can more than match their numbers with underprivileged children in our own communities whose less effectively voiced appeals have never, perhaps, reached our ears. We must remember that the foreign child for whom a well-intentioned agency requires from us a comfortable minimum of support and education may, on the expiration of the war, return to a home — like many of our own homes — for whose hardships we have ill adapted him.

The safety, the well-being, the education of our youthful hostages of fate should be provided for on a scale commensurate with the environment from which they come, but too much sentimentality will interfere with the expeditious transaction of the business. The foster parents, also, must be protected from too severe a repercussion of their generosity. If those who are answering the appeal of this good work are to guarantee subsistence to an unknown waif, they must have some guarantee that mistakes in matching the child to the home are also to be rectified. The best committee under these circumstances is one that accepts continuing responsibility.

Let us be willing — and we are willing — to give these bewildered refugees equal advantages with our own children of an equal economic station,

but let us not forget, in the exaltation of our emotionalism, that we have not borne our own less dramatic burden too generously in the past.

ALIENS AND THE PRACTICE OF MEDICINE

The recent rapid influx of refugees to the United States has brought to the front some problems which are relatively new. Immigration in the past has chiefly involved the assimilation of workers in the lower grades; however, as of June 30, 1939, a total of 4549 refugee physicians had entered the United States in nine years, 1385 arriving within the previous fiscal year.* It is usually thought that under the present system of giving medical care, there are already too many doctors in the United States, and just how medical practice can be provided for the newcomers from abroad is not clear. Is it to be by taking practice and therefore livelihood from members of the American medical profession so that more of them are to become unable to support themselves? Fear has been expressed that further overcrowding will lead to further degradation of medical practice.

Methods of restriction have been rather widely adopted by the states and fall into three groups: those requiring citizenship (declaration of intention or full citizenship), those requiring supplementary educational experience and those requiring fulfillment of conditions that are almost or quite impossible for the refugee to meet. While these restrictions have been advocated on the ground of protection for the public, their relation to protection is not always clear. The insistence on citizenship for the physician suggests the nationalistic spirit, and unbridled nationalism has wrought such havoc, at least in the past half century, that we may well question such an attitude to see if it be for good or ill.

Although the science of medicine and the art of scientific medical practice ought to be the same the world over, if two groups of people have lived in comparative isolation, they may have customs and conventions differing in many important respects, even if both groups are relatively highly civilized. Thus there is, on occasion, some reasonable basis for the requirement made by a few states that the foreigner spend one year in an approved medical school in the United States and another year in an approved hospital as intern before he is admitted to examination for registration. But how absurd these requirements are in the case of some distinguished specialist from abroad, if the candidate is expected to learn merely more medicine!

Requirements which are almost or quite impossible for the candidate to meet deserve careful scrutiny. Is their imposition because they are a restriction merely a manifestation of benighted nationalism? Or has it been shown clearly that there are too many well-equipped physicians for the good of the public, so that the protection of the public demands a numerical restriction? Are these requirements other or more difficult to fulfill for foreigners than for persons who have received their medical education in the United States? The apparent justice of having the same or similar requirements for all candidates deserves thoughtful consideration. What is the justice in removing restrictions so that it is easier for a foreigner to become registered as a physician than it is for a native? There are a number of problems here which do not seem to have received sufficient attention.

What is the justification for the requirement of citizenship, or of declaration of intention leading ultimately to citizenship? Is the alien, because he is an alien, a better or a worse doctor than is a citizen? Of course the answer is that he is no better and no worse, as such. Yet a person living all his life according to one set of customs can undoubtedly continue in their observance more easily than can another person who is precipitated into their midst after fifty years in quite different surroundings.

The importance of the differences of custom and convention is quantitative. If there were some test of the amount of adjustment attained in one or two or five years of residence, that might be a

*Editorial: Citizenship as a condition precedent to medical licensure in the United States. *J. A. M. A.* **113**:1496, 1939.

reasonable, though possibly difficult, procedure to apply. But citizenship is no measure of actual adjustment or of actual competence at any stage in the procedure, and laws demanding it as a prerequisite to licensure appear to be the result of a possibly well-intentioned but probably misdirected effort to protect doctors and, perhaps through them, the public. From some points of view, though not all, it may be regarded as questionable statesmanship.

There is another way of regarding citizenship, namely, as a great privilege carrying with it real advantages — a great opportunity to exercise the power which belongs to adulthood, instead of restricting oneself to political infancy or childhood. If these are the things citizenship represents, aliens might well be eager to secure them.

MEDICAL EPONYM

Colles' Fracture

In the *Edinburgh Medical and Surgical Journal* (**10:** 182–186, 1814) appears a communication "On the Fracture of the Carpal Extremity of the Radius" by Abraham Colles (1773–1843), Dublin physician, one of the professors of anatomy and surgery in the Royal College of Surgeons in Ireland.

> The injury to which I wish to direct the attention of surgeons, has not, as far as I know, been described by any author; . . . .
>
> This fracture takes place at about an inch and a half above the carpal extremity of the radius, and exhibits the following appearances.
>
> The posterior surface of the limb presents a considerable deformity; for a depression is seen in the forearm, about an inch and a half above the end of this bone, while a considerable swelling occupies the wrist and metacarpus. Indeed, the carpus and base of metacarpus appear to be thrown backward so much, as on first view to excite a suspicion that the carpus has been dislocated forward.
>
> On viewing the anterior surface of the limb, we observe a considerable fulness, as if caused by the flexor tendons being thrown forwards. This fulness extends upwards to about one third of the length of the forearm, and terminates below at the upper edge of the annular ligament of the wrist. The extremity of the ulna is seen projecting towards the palm and inner edge of the limb; the degree, however, in which this projection takes place, is different in different instances.

R. W. B.

MASSACHUSETTS MEDICAL SOCIETY

SECTION OF OBSTETRICS AND GYNECOLOGY*

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Fatal Double Pneumonia in Pregnancy

Mrs. A. K., a twenty-three-year-old primipara, entered the hospital on March 19, 1939, with a diagnosis of pneumonia. She was in the thirty-first week of pregnancy.

The patient's past and family histories were negative. Catamenia began at twelve, were regular with a twenty-eight-day cycle and lasted four days. The last period began on August 15, 1938, making the expected date of confinement May 22.

The patient was first seen in the third month of pregnancy. An examination at that time was normal in every respect. The pregnancy progressed normally and uneventfully until March 18, when she was seen by her physician. She had had a head cold for a week, and had developed a cough and general soreness and pain throughout the body. She also complained of a headache. The temperature was 101°F., and the pulse 100. The following day she was sent to the hospital.

On admission the patient was cyanotic; respirations were labored and wheezy. The temperature was 103.6°F., the pulse 120, and the respirations 45. The eyes, ears, nose and throat were negative. Rales were heard throughout both lungs, both back and front. There was dullness in the right lower lobe. The heart was within normal limits; there were no murmurs. The abdomen was distended and showed a mass the size of a seven months' pregnancy. The white-cell count was 15,900. The sputum was sent to the laboratory for typing. Narcotics were given for pain.

On the following day, March 20, the white-cell count was 3500. A consultant's notes read: "The woman is markedly cyanotic, with labored and rapid breathing. The radial pulse is very small in volume, and the heart rate rapid. The lungs on both sides are filled up, as evidenced by numerous moist rales. In addition there is extensive bronchial breathing all over the left back, with some on the right. My impression is that she is

*A series of selected case histories by members of the section will be published weekly. Comments and questions by subscribers are solicited and will be discussed by members of the section.

overwhelmed with pneumonia, and I doubt if any form of treatment will be of avail. If the general condition should improve, even without being able to determine the type of pneumonia, I think it would be worthwhile to try sulfapyridine." Cultures of the blood and sputum were reported as containing *Staphylococcus aureus*. The patient grew steadily worse and expired at 1:15 p.m. on March 20, undelivered.

An autopsy, in which no organs were removed, showed the following: bronchopneumonia, right lower lobe, and confluent pneumonia, left lower lobe (*S. aureus*); multiple abscesses, right lower lobe; acute fibrinous pleuritis on the right; pyothorax on the right; acute passive congestion of liver; pregnancy, approximately seven months.

Comment. This case illustrates the value of taking care of any upper respiratory infection during pregnancy. Apparently the patient did not seek medical advice until she was quite sick. Had she been put to bed at the beginning of the infection, it is barely possible that pneumonia might have been averted. The disease was of the extremely fulminating, influenzal type, with a superimposed *S. aureus* infection. When the patient arrived at the hospital, it is interesting that the medical consultant made the statement, "If the general condition should improve, . . . I think it would be worthwhile to try sulfapyridine." Apparently she was so sick on admission that the outcome was considered hopeless. The patient died undelivered. The seriousness of pneumonia during pregnancy cannot be disregarded.

DEATHS

CLARK — J. Payson Clark, M.D., of Boston, died July 21. He was in his eighty-first year.

Born in St. Louis of Virginian ancestry, he came to Boston in his youth, attended Roxbury Latin School and Harvard University and received his medical degree from Harvard Medical School in 1887. He was house officer at the Massachusetts General Hospital and the Boston Lunatic Asylum. Following further study in Vienna and Dublin, he began his practice in Boston.

Dr. Clark was a member of the Massachusetts Medical Society and the American Medical Association, a fellow of the American Laryngological Association, of which he had been treasurer and president, and a member of the American College of Surgeons.

A sister survives him.

HOOPER — George H. Hooper, M.D., of Belmont, died July 24. He was in his forty-ninth year.

Born in Champion, Michigan, he attended Lawrence College, Wisconsin, and Tufts College Medical School, where he received his degree in 1919. He served his internship at the Boston City Hospital.

Dr. Hooper was a fellow of the Massachusetts Medical Society and the American Medical Association.

His widow survives him.

MULDOON — Mary T. Muldoon, M.D., of Lexington, died July 18. She was in her forty-seventh year.

Born in Boston, she received her degree from Tufts College Medical School in 1915. For the last twenty years she had been connected with the Fernald School.

Dr. Muldoon was a member of the Massachusetts Medical Society and the American Medical Association.

A sister and nieces and nephews survive her.

WHORISKEY — John J. Whoriskey, M.D., of Cambridge, died July 26. He was in his sixty-fourth year.

Born in Cambridge, he received his medical degree from Harvard Medical School in 1899 and served his internship at St. Elizabeth's Hospital, where he was chief-of-staff for many years.

Dr. Whoriskey was a fellow of the Massachusetts Medical Society and of the American Medical Association.

His widow and three sons survive him.

MISCELLANY

NOTE

The appointment of Dr. John W. Chamberlain, of Belmont, as assistant director of the Department of Hygiene at Massachusetts Institute of Technology was recently announced. Announcement was also made of the appointment of Dr. Robert T. Monroe and Dr. Edward Harding, both of Brookline, as assistants to the director, Dr. George W. Morse. Dr. Chamberlain, who has been an assistant in the Department of Hygiene since 1937, will share with Dr. Morse the administrative duties of the department, including supervision of the Homberg Memorial Infirmary, which cares for the health of 3000 students.

CORRESPONDENCE

A EUROPEAN EXPERIENCE

To the Editor: These notes cover the period when I was a George Gorham Peters Traveling Fellow in Surgery between January and May, 1940. The greater part of the time was spent in the Department of Surgery of Edinburgh University and on the wards of the Royal Infirmary, Edinburgh, under the direction of Professor J. R. Learmonth.

I had planned to go to Europe in September, 1939, but, with the onset of war, my trip was canceled. However, as winter came on and hostilities on the western front did not increase, it seemed worthwhile to go ahead with my original plans. So I sailed from New York City on December 30, 1939, on the *S.S. Manhattan* for Genoa, Italy, and had a calm, uneventful trip until we reached Gibraltar six days later.

Gibraltar harbor was full of activity, with armed British vessels constantly coming in and out of the harbor and numerous ships standing by waiting to be inspected for contraband by the British authorities. The *Manhattan* dropped anchor to wait its turn, and since it was to remain in port for forty-eight hours, the passengers were allowed shore leave. An air-raid warning was sounded while I was ashore which sent everyone scurrying for shelter, but it proved to be a false alarm. Nevertheless, it offered a proper introduction to present-day Europe. The hills of Spanish Morocco just about seven miles across the Straits of Gibraltar were clearly visible and were said to be heavily fortified. However, although only a few of the fortifications could be seen, I was struck by the apparent impregnability of the Rock of Gibraltar.

The *Manhattan* docked in Genoa on January 9. There I remained overnight in order to do some hurried sightseeing and then caught the Rome-Paris express on January 10. Soldiers in uniform were to be seen everywhere, but at that time there was no noticeable warlike tension.

Paris, where I arrived the following morning, was dark, gloomy and sandbagged. There was a definite sense of war in the air, and no trace of the traditional Parisian gaiety. The railroad stations were teeming with troops coming and going. In fact, it seemed to me that nine out of every ten men in the city were in uniform, either in the dress of the regular army or of one of the colonial troops. My twenty-four hours in Paris instead of being gay were quite depressing, due in part to the French blackout — my first — and the dim, cold blue lights permitted on the streets.

On January 12 I set off to Calais to cross the channel to England. The channel crossing was made on a small boat convoyed by several destroyers. About midway across the channel we passed a large spot of oil and debris where it was pointed out that a tanker had struck a mine the day before. The life belts which both passengers and crew were required to wear throughout the trip, at first clumsy and uncomfortable, seemed most reassuring. There were very few civilians on board but a good many British soldiers. Instead of Dover, the regular pre-war terminal for the run from Calais, the boat docked at Folkestone, for Dover was said to be a vital part of the military life line between Britain and France and hence closed to civilian traffic. Here at Folkestone the customs and passport inspection was strict, whereas in France and Italy it had been rather lax. I went directly to London and arrived during a blackout and a fog. There is nothing darker than this combination. It was not an encouraging outlook for a visitor, so on I went to Edinburgh where I arrived just fifteen days after leaving America.

I arrived in Edinburgh also during a blackout, and it seemed to me, if possible, to be even darker than it had been in London. Automobiles had only one headlight which cast a beam of light about ten yards, and the street-cars had very dim running lights. The first few nights I found it difficult to get around in the blackout, but one quickly becomes adjusted. To be sure, people went out at night much less than in normal times. When one did go out after dark, a small flashlight was essential, but it was absolutely taboo to shine a flashlight skyward. I found flashlights and batteries expensive and scarce, so my pocket examining light did double duty and became a treasure for after-dark walking. Daylight saving, instituted in March, was a great help. Interestingly enough, there was no increase in crime with the institution of the blackout, although road accidents were frequent during blackout hours for obvious reasons. To me these hours of enforced darkness, while serving as a defensive measure, were a constant reminder of the war.

Since my days were to be spent largely in the Royal Infirmary, I was fortunate to obtain a comfortable room in a house nearby. The landlady was a delightful elderly Irish woman, who made the best of everything, including food rationing and hard times. At mealtimes I met the other lodgers — an army officer, a secretary, an insurance man and a fifth-year medical student — and with them talked war, for that was the main topic of conversation in the house at all times. Their attitude throughout was one of determination, but they, like everyone, were depressed. This outlook of depression was reflected in the appearance of the town in general. There were no flags flying or bands playing; soldiers were everywhere, not in brilliant parade uniforms, but in the somber garb of battle dress.

Food rationing was of great interest to me. It was not in effect for actual shortage of foodstuffs but in anticipation of the months ahead. In each city there were one or more food-control offices where ration coupon books were obtainable. According to custom these were given to the landlady, who did all the shopping, but it was not necessary for persons in transit to present a ration book to eat at hotels and restaurants. Food was rationed by price more than by individual needs, and in the *Lancet* (1:743, 1940) there was an excellent common-sense discussion of the problem. There it was pointed out that people in the low-income groups are pushed farther away from an adequate diet, both by food prices and lack of knowledge of proper food. In fact, people eat what they can afford and not what they need. The situation was aptly compared to Hobson's choice. Hobson's customers, you will recall, had to take the horse nearest the stable door whether they liked it or not. It was further pointed out how difficult it was to educate the masses about food requirements.

The air-raid precautions proved enlightening to me. For the actual raid there were underground shelters, all of which were lined with corrugated sheet metal and were half under the ground and covered with earth and sandbags. These were bomb-splinter proof but not proof against a direct hit. Each shelter was provided with two entrances in case one became blocked, and each was equipped with a spade in the event that it became necessary to dig out. Some of the shelters were furnished with a few comforts and food, but most of them were like old-fashioned, barren, storm cellars. Every householder had a shelter in his backyard, and there were many public ones located in parks and public gardens for those who might be abroad during a raid. There was a tendency for civilians to stand outside during air-raid alarms to see what was going on, and as a result, several were wounded by shrapnel from their own antiaircraft guns. No doubt with the war in its present stage, full advantage of shelter will be taken. During my visit no bombing raids occurred, but German scouting aircraft were over several times each week. Many of the public buildings were protected with sandbags, and large glass windows were either removed or boarded over. The shops, like those in Paris, had covered their show windows with adhesive tape to prevent splintering.

First-aid posts were distributed throughout the city to provide immediate care for wounded civilians. From these posts the seriously wounded would be sent to the hospital for that area; and from there patients would be evacuated to safer areas as soon as possible. Each hospital has organized operating teams and has arranged to expedite the rapid handling of many casualties. Extensive preparations for blood transfusions and the administration of parenteral fluids and of gas-gangrene antitoxin have been made. Needless to say, the medical profession has worked literally day and night to prepare for the effects of total war.

A large number of firemen and air-raid wardens were constantly on duty to help battle expected fires and confusion. Everyone from infancy upward was provided with a gas mask, but few people bothered to carry them until Germany invaded Holland and Belgium. Thereafter people started keeping their masks with them.

The two medical schools in Edinburgh, the Royal College of Surgeons and the University of Edinburgh Medical School, were functioning in a more or less normal fashion. The medical schools in Glasgow and Aberdeen were also carrying on, whereas those in London and Paris were evacuated at the start of the war. The students seemed to me much younger than those in America, and

there were many more women students. As yet the medical students have not been called into the army, but they all have a part in the civilian air-raid precautions, either in first-aid posts or on operating teams.

I worked as clinical assistant on Professor J. R. Learmonth's ward at the Royal Infirmary and found it most interesting. The infirmary is the largest voluntary hospital in the United Kingdom and has a proud history. A wealth of clinical material flowed into all its departments despite the fact that admissions were limited to urgent cases "for the duration." The run of cases was much like that of any general surgical service, except that a large number were the result of coal-mine accidents and, during the blackouts, of road accidents. There are seven surgical services, each of which is a complete unit and is headed by one of the senior surgeons — Professor J. R. Learmonth, Sir John Fraser, Mr. J. M. Graham, Mr. W. Quarry Wood, Mr. W. J. Stewart, Mr. A. Pirie Watson and Mr. Frank E. Jardine. Each service operates twice weekly, plus one day a week for receiving emergencies. Both a male and female ward of thirty-six beds are assigned to each service, and six beds on every ward are kept free for possible civilian air-raid casualties. It was quite striking to note the large number of old people in the hospital. This was due, of course, to the fact that the majority of the younger groups were in the army or in other war work. This predominance of elderly people would make evacuation of the patients difficult in the event of an air raid, particularly because most of the buildings are old and have outdated physical equipment.

There were numerous empty hospitals in and about Edinburgh which were awaiting the war wounded. Some had been rapidly erected for this purpose, and others were older hospitals that had been remodeled to meet the expected needs. Hospital ships carrying wounded soldiers were expected on several occasions but docked elsewhere.

While I was there, all soldiers and sailors were treated in military hospitals. However, when any of the German citizens who were interned nearby became ill, they were treated at the Royal Infirmary. One of these interned Germans was interesting. He was a young man with a lump in his neck which had been biopsied in Germany about a year before. He was brought into the infirmary for another biopsy and was placed on the police ward. His knowledge of English was so very poor that when he was given his preoperative medication, he was firmly convinced that the "brutal English" were going to torture him. It took several days for him to get over his fear of English-speaking doctors.

The Edinburgh surgeons do excellent work, and their surgical judgment and anatomical knowledge seemed to me unparalleled. Their surgical technic is different from that of most American surgeons in that assistants are not used so much and they sew much more with their fingers. Continuous chromic catgut was the usual suture material except on the skin, where silkworm-gut was used. It was of interest to note that they did not place any sutures in the subcutaneous fat but depended on the skin sutures and dressing to close the dead space. In a series of ninety-five clean wounds that I observed, six became infected and one contained a collection of serum. Since a goodly number of surgeons, both young and old, were in the army, the staff was somewhat short-handed. However, everyone carried the extra load in a splendid spirit. The Wilkie Surgical Research Laboratory is an excellently arranged and equipped laboratory at the University of Edinburgh, but during wartime very little research work is being carried out there.

On May 6 I went to Glasgow to visit the Western Infirmary, where Professor F. C. W. Illingworth is head of the Glasgow University Department of Surgery. It was at this hospital that Joseph Lister did his first work on asepsis. The hospital has a beautiful location on a hill from which the balloon barrage along the River Clyde is easily visible. Glasgow at that time did not appear so warlike as Edinburgh, but there were many French troops about, presumably en route to Norway. Four days later I went to Aberdeen to visit its medical school and the Royal Infirmary. Both these institutions are quite new and modern, and, physically at least, appeared more American than those in Glasgow and Edinburgh. The countryside around Aberdeen and Glasgow is beautiful. Loch Lomond is only a few miles from the latter, and the Highlands only a few miles from the former.

While I was in Aberdeen, the Germans invaded Holland and Belgium, and there arose considerable excitement in Britain about persons belonging to the "Fifth Column." Because of this feeling the government issued a proclamation that all aliens must report to the police daily, must not leave town, must not ride in any conveyance except a public one, and must be in their living quarters from 8 p.m. until 6 a.m. To my chagrin, Americans were regarded as aliens. This regulation only applied to protected areas, such as Edinburgh, Aberdeen and London. It was also rumored that the French-Italian frontier would soon be closed. Since it was obvious that travel was not going to be easy, I decided on May 14 to leave for Italy while I could.

I had a reservation on the *S.S. Manhattan* sailing from Genoa on June 1, and was fortunate in having an exit permit and a permit to take money out of the country. I saw the censors May 14 and had my luggage examined and sealed. On May 15 I left for London. By then people were expecting the worst at any time. On May 16, after having had one airplane passage to Paris canceled, I got a second plane late in the day, but not until after the customs officials had confiscated my camera. This mode of travel was necessary because civilians were not allowed to cross the channel by boat. I reached Paris about 6 p.m. and boarded the 8:30 p.m. train for Genoa. The railroad station was packed with refugees and was not a pretty sight. Most of these people were dry eyed, but looked as if they had been through hell. The train also was crowded with people attempting to get to Genoa to obtain passage to America, and any sort of a seat was at a premium. The customs inspection at the French-Italian frontier was painfully thorough. When we entered Italy, troops could be seen moving constantly along the roads toward the frontier. I arrived in Genoa late in the afternoon of May 17 and found the *S.S. Washington* was slated to sail the next day. Fortunately, I was able to exchange my reservation on the *Manhattan* for one on the *Washington*. The few Italians that I could converse with in English were not keen on war but were ready to do what they were told.

The voyage back was without event. The contraband search at Gilbraltar required only about eight hours instead of the previous forty-eight, and there were noticeably fewer merchant vessels in the harbor. The only things suggestive of war were two British submarines cruising submerged in the harbor. After the *Washington* entered the Atlantic, we did see a large convoy of allied merchantmen.

The *Washington* was very crowded. Cots had been placed in all the staterooms, and deck space for exercising or sunning was at a premium. A goodly number of the passengers were refugees from the warring nations of Europe who hoped eventually to become American citizens. Very few of them talked about their past or com-

plained about the ship's being crowded, because they were so glad to be on their way to the United States. The remainder, some five hundred, were Americans returning home. Everyone was obviously happy on the thought of reaching America again. I know that I certainly was.

THOMAS W. BOTSFORD, M.D.

Peter Bent Brigham Hospital,
Boston.

REPORT OF MEETING

HARVARD MEDICAL SOCIETY

A regular meeting of the Harvard Medical Society was held at the Peter Bent Brigham Hospital on April 9, with Dr. Soma Weiss presiding.

The medical case presented was that of a nineteen-year-old girl, who entered the hospital because of dyspnea, weakness and pallor. At twelve years of age she experienced six weeks of migratory polyarthritis. The following year menstruation began; the periods were irregular and profuse and lasted from nine to thirteen days. In November, 1938, the patient first noted exertional dyspnea and afternoon ankle edema, but continued going to school until the following May when she was obliged to take to bed due to excess fatigue. In August, 1939, she felt better but still required eighteen hours a day in bed and had episodes of fainting. A local physician was consulted in March, 1940, and he prescribed liver extract and iron. Physical examination on admission revealed a pale young woman in whom merely sitting up in bed occasioned extreme dyspnea. The pulse was 150, and the respirations 40. The heart was enlarged to the left, and there was an apical systolic thrill and a loud and metallic aortic second sound, associated with an aortic systolic murmur. The uterus was retroverted, retrogressed and nodular, and there was rather profuse vaginal bleeding. The hemoglobin was 15 per cent, the red-cell count 1,200,000, and the hematocrit 10 per cent. Treatment consisted of 2000 cc. of whole blood in repeated transfusions, with a rise of the hemoglobin to 61 per cent, of the red blood cells to 3,450,000 and of the hematocrit to 31 per cent in eight days.

In discussing the case, Dr. John G. Gibson, 2nd, emphasized the importance of large amounts of blood in combating serious degrees of anemia. Dr. Elliott C. Cutler questioned the wisdom of transfusions in patients who have one large hemorrhage and are not expected to have another. He reasoned that such a procedure may remove the stimulus for regeneration in the bone marrow. Dr. Soma Weiss stated that the patient probably had no heart trouble other than anemia, but he warned that occasionally such a myocardium may fail to respond completely and that this may result in residual myocardial disease.

The surgical case was that of a sixty-nine-year-old man admitted on January 29, 1940, after allegedly being struck by an automobile half an hour prior to entry. There had been no period of unconsciousness before admission, and his memory for details was good. Physical examination revealed a 15-cm. laceration of the scalp and a compound comminuted fracture of the right lower leg. The patient was in incipient shock with a pulse of 100 which was moderately weak. The blood pressure was 90 systolic, 50 diastolic. The patient appeared gray and anxious. Dry sterile dressings were applied to the wounds, and the patient was put in a moderate Trendelenburg position and covered with blankets. Fifteen milligrams of morphine sulfate was administered after a neurological examination was found to be negative. Roentgenograms were immediately taken of the leg but none of the skull, and the patient was taken to the operating room for a transfusion. There were signs of improvement after 500 cc. of blood, followed by 1000 cc. of normal saline, had been given; débridement of the leg wound was carried out, and plaster was applied over a dry sterile dressing. Simultaneously there were carried out débridement, cleansing and tight suture of the scalp wound. After the danger of shock had passed, subsequent manipulation of the leg was performed. Laboratory data on entry showed a hemoglobin of 90 per cent, a red-cell count of 4,500,000, a white-cell count of 20,000 and a hematocrit of 46 per cent. On the second day the hemoglobin fell to 60 per cent, the red-cell count to 3,400,000 and the hematocrit to 36 per cent. Another blood transfusion and the administration of ferrous sulfate brought about a gradual return to normal values. Dr. Cutler alluded to the fact that a systolic blood pressure of 90 is really serious in a patient whose original level was 170 to 190.

The first speaker of the evening was Dr. Gibson, who discussed "Experimental Observations on the Physiology of Shock," based on experiments on burns. It was pointed out that the fault is essentially a peripheral rather than a central one. The important changes observed were diminished blood volume, which amounted to about one fifth of the total volume, increased viscosity of the blood and a rapid pulse. The respirations, mean arterial blood pressure and oxygen saturation remained about the same until terminally when the blood pressure showed a sharp drop and oxygen saturation fell to low levels. The mechanism is considered to be a loss of fluid into the site of injury, with subsequent compensatory sympathicoadrenal activity which may finally augment the effect of the noxious agent. An increase in capillary permeability resulting from anoxia may also play a role in the continued loss of fluid. The effects of various types of treatment proved that nothing helped late and that plasma was the best remedy early. Fifty per cent glucose was of only temporary benefit, while normal saline caused transitory dilution of the circulating blood. Whole blood seemed to cause an increase in viscosity with no marked improvement in the circulating blood volume.

Dr. J. Englebert Dunphy continued with "Observations on the Pathology of Shock." By studying the changes during various phases of shock it was determined that in the early stages of traumatic shock significant pathologic changes are confined to the site of injury. In the late stages of shock there are generalized pathologic changes, characterized by capillary dilatation, congestion and edema throughout the lungs, liver, kidney and gastrointestinal tract. New changes, however, were not so marked as those described by Moon. There were changes in the adrenal gland which consisted of polymorphonuclear leucocytic infiltration and capillary congestion of the zona fasciculata. These occurred early in the shock period and were not simply a manifestation of generalized normal congestion. Whether the late changes were toxic or ischemic and hence due to lack of oxygen was not determined. It was found that the use of infusions of plasma were the most effective means of maintaining the blood volume at normal levels. However, although the late pathologic changes of shock were minimized by maintaining the blood volume at normal levels, these were not entirely prevented. This suggests that some factor other than blood volume is involved in the pathogenesis of shock.

The "Clinical Aspects of Shock" were discussed by Dr. Eugene A. Stead, Jr. After recounting the great groups

of cases in which shock may be observed, the speaker reminded the audience of the difficulty in interpreting animal experiments because so many factors influence the time of onset of shock. Dr. Stead differentiated the clinical signs of shock with and without arteriolar constriction. He stated that the latter type responds better to transfusion, while the peripheral blood pressure in the former cannot be used as a criterion for treatment and prognosis. Observations on blood loss indicate that no signs are present until more than 500 cc. are lost and that when the frank manifestations of shock appear, treatment may already be of no avail. An important prognostic finding is the plasma-protein value, for patients with a poor reserve fail to regain and maintain an adequate circulation volume and do poorly on the whole.

NOTICES

ANNOUNCEMENT

ALFRED HURWITZ, M.D., announces the removal of his office from 483 Beacon Street to 113 Bay State Road, Boston.

AMERICAN BOARD OF OPHTHALMOLOGY

There will be only one written examination during 1941. This will be held in various cities throughout the country on March 8. Candidates enrolled in the Preparatory Group who have been advised that they will be eligible for examination during 1941 should make application at once to take this written examination.

Application must be made on the regular blanks provided for the purpose and must be received before December 1, 1940.

Oral examinations in 1941 will be held at Cleveland in May or June and at a place to be announced in October; the deadlines for submitting case reports are February 1 and July 1 respectively. A special oral and clinical examination will be held on the Pacific Coast during 1941 provided there are enough candidates to warrant it. Applications for this examination should be filed before September 1, 1940, so that the Board may complete necessary arrangements.

All candidates planning to take the examination in 1941 should write at once to the Board Office for formal application blanks, indicating their preference of examination place. Letters should be addressed to American Board of Ophthalmology, 6830 Waterman Avenue, St. Louis, Missouri.

SOCIETY MEETINGS AND CONFERENCES

SEPTEMBER 2–6 — American Congress of Physical Therapy. Page 862, issue of May 16.

OCTOBER 6–11 — Annual meeting of the American Academy of Ophthalmology and Otolaryngology. Page 81, issue of July 11.

OCTOBER 8–11 — American Public Health Association. Page 655, issue of April 11.

OCTOBER 11, 12 — Pan-American Congress of Ophthalmology. Page 898, issue of May 23.

OCTOBER 14–25 — 1940 Graduate Fortnight of the New York Academy of Medicine. Page 938, issue of May 30.

OCTOBER 21 — American Board of Internal Medicine. Page 369, issue of February 29.

JANUARY 4, 1941 — American Board of Obstetrics and Gynecology. Page 1064, issue of June 20.

APRIL 21–25, 1941 — American College of Physicians. Page 1065, issue of June 20.

MARCH 8, 1941 — American Board of Ophthalmology. Notice above.

BOOK REVIEWS

The Kosher Code of the Orthodox Jew: Being a literal translation of that portion of the sixteenth-century codification of the Babylonian Talmud which describes such deficiencies as render animals unfit for food (Hilkot Terefot, Shulhan 'Aruk); to which is appended a discussion of Talmudic anatomy in the light of the science of its day and of the present time. By S. I. Levin and Edward A. Boyden, Ph.D. 8°, cloth, 243 pp., with 5 illustrations. Minneapolis: University of Minnesota Press, 1940. $4.50.

From the dawn of Jewish history, medicine exercised a special interest on the Jewish mind. Medicine was an integral part of the ritual life. The vast subject of "uncleanliness" in connection with defilement from dead bodies, menstruation and its disorders, leprosy and so forth had its actual medical bearing. It is for these reasons that the medical historian, Dr. J. H. Boas, states, "It corresponds in the reality, in both the actual and chronological point of view, to consider the Jewish as the creators of the science of public hygiene." Furthermore, the Biblical prohibition of eating any flesh that is "torn of the beasts of the field" (Terefah) or anything that "dieth of itself," gave rise to dietary regulations which included the postmortem examination of animals destined for food. These investigations resulted in the accumulation of a very practical knowledge of animal anatomy and physiology by the rabbis who specialized in this field of research. Although these facts are scattered throughout their religious literature, a systemic body of anatomical and medical knowledge did not develop. It is from this point of view that the authors of this book make a distinct contribution. Rabbi Levin and Professor Boyden have given us, for the first time, a literal translation in English of that portion of the sixteenth-century codification of the Babylonian Talmud which describes such deficiencies as render animals unfit for food (Hilkot Terefot, Shulhan 'Aruk). The translation is accurate and literal, and for this reason, it reflects the terseness of the text. It preserves the original flavor of this vernacular account, and also provides an accurate source material. Of great value to the student of medical history are the numerous notes appended to the text. With the patience of a true scientist, Professor Boyden has discussed each term of Talmudic anatomy in the light both of the science of its day and of that of the present time. This volume should be a valuable addition to the library of all students of medical history.

Illustrations of Bandaging and First Aid. Compiled by Lois Oakes, S.R.N., D.N. (Leeds and London). 8°, cloth, 248 pp., with 108 plates. Baltimore: Williams & Wilkins Company, 1940. $2.00.

The aim of the book, according to the author, is "to enable the student, by means of pictures, to quickly master the science and art of bandaging and of first-aid in fractures and haemorrhages."

The illustrations consist of 290 photographs, many of which have been touched up to emphasize the edges of bandages and the directions in which folds and knots take place. On the whole the illustrations serve very well to clarify the brief, outlined text. Nearly half the book is given over to elaborate description of the manifold methods of using a triangular bandage. The remainder concerns itself with roller bandaging and first aid in hemorrhages and fractures. The latter sections

take no recognition of many of the changes in practice that have taken place during the last few decades; for example, the section dealing with fractures at no point mentions traction splints or the use of traction. Many of the text instructions are so brief as to be of no particular value to the student; thus the instruction for control of hemorrhage from the dorsalis pedis artery simply states: "Place the thumb over the lower end of the tibia."

The author, a teacher in nursing, has apparently written the book for the use of lay groups whose war work may involve them in the need for rendering first aid. It is distinctly less useful than many of the manuals of first aid that are already available in this country.

King Gustaf V's Stockholm Jubilee Clinic for Radiotherapy and Research in Cancer: A description. By Gosta Forssell, Elis Berven, Olle Reuterwall and Rolf Sievert. 8°, paper, 80 pp., with 8 plans and 32 illustrations. Stockholm: P. A. Norstedt & Söner, 1939. Swed. kr. 8.

Sweden has long been in the forefront of advance in roentgen and radium treatment. At the Roentgen Institute of the Serafimer Hospital and at the Caroline Hospital, both in Stockholm, many advances have been reported in the last thirty years. A new clinic has recently been opened. This book describes in detail not only the work done at the clinic, but also the new building. There are many illustrations as well as plans of this superb center for research and treatment.

Short Stature and Height Increase. By C. J. Gerling. 8°, cloth, 159 pp., with 5 illustrations. New York: Harvest House, 1939. $3.00.

The author has attempted to write a book on the subject of stature, weight and height for the lay public. He has tried to correlate endocrinology, food and nutrition, inherited characteristics and an individual's occupation with respect to his appearance. However, the entire subject is considered in a sketchy manner, with errors of omission rather than commission. The facts are presented in a loose way, and the use of scientific terms to add authority is deplorable. The failure to explain clearly or to qualify statements makes the entire text a potpourri which cannot be recommended to even the layman.

Sexual Disorders in the Male. By Kenneth Walker, F.R.C.S., and Eric B. Strauss, D.M. F.R.C.P., with a foreword by Sir Walter Langdon-Brown, M.A., M.D., D.Sc., F.R.C.P. 8°, cloth, 248 pp., with 9 illustrations. Baltimore: Williams & Wilkins Company, 1939. $3.00.

This treatise is unique in that it combines, in happy proportion, the point of view of the urologist and that of the psychiatrist. The book is well arranged; in the first portion are included the known facts relating to the physical aspects of the sexual organs in so far as they have to do with the sex function, while the second part gives the psychopathology of sexual deviations and the measures that may be taken to remedy these defects.

In presenting the facts underlying the behavior of the sexual function, the authors have taken nothing for granted and have avoided a repetition of statements, the truth of which is based solely upon frequent reiteration. The entire situation has been appraised in the light of recent neurological and hormonal studies. The section dealing with the psychiatric aspect of the problem states clearly and simply the problems involved and outlines their treatment.

The book as a whole is characterized by the moderation, balance and sanity of the writers' opinions, and by a method of presentation of intimate details which avoids completely any offense to the sensibilities of the reader. It is by far the best book on this subject which the reviewer has seen.

Displacement of the Calcified Pineal Body in Roentgen Pictures as an Aid in Diagnosing Intracranial Tumours: An anthropometrical-statistical analysis. By Bengt Lilja. 8°, paper, 182 pp., 40 tables. Stockholm: P. A. Norstedt & Söner, 1939. Swed. kr. 10.

It has long been recognized that displacement of the pineal body is an important sign in indicating intracranial tumors. Fortunately, the pineal gland is calcified in a large percentage of cases. The author of this monograph has carefully verified the position of the gland in a large group of normal individuals; he found that it is visible by x-ray in at least 40 per cent of the subjects examined. He then examined 80 cases of proved intracranial tumor and noted that 37 per cent showed a displacement of the pineal body. He gives exact measurements for such displacements, showing the variations in the position of the body which can be considered normal. This research, on a highly technical subject, can be strongly recommended to those who are interested.

Frontier Doctor. By Urling C. Coe, M.D. 8°, cloth, 264 pp. New York: MacMillan Company, 1939. $2.50.

This is a well written and interesting story of a young medical graduate, who in 1905 went far up into central Oregon, over one hundred miles from the nearest railroad station. There in a small lumbering town he practiced for thirty years. His experiences are of great interest, as this was the last frontier to be opened in America, and he might be well termed the last of the frontier doctors. The book is full of exciting stories of his adventures with the roughest type of individuals. It should be noted that he, as a physician, held a high place in the community and was immune from assault. His endeavors were usually appreciated, and many a life was saved by his activities. He eventually became the leading citizen of Farewell Bend, Oregon. This book can be highly recommended as a straightforward and honest account of a fine physician who upheld all the best traditions of the profession.

The Surgery of Injury and Plastic Repair. By Samuel Fomon, Ph.D., M.D., 4°, cloth, 1409 pp., with 925 illustrations. Baltimore: Williams & Wilkins Company, 1939. $15.00.

This large compilation, consisting of twenty chapters, represents great industry. The first nine chapters are devoted to general principles, such as tissue transplantation, wounds, fluid, salt and acid-base balance and so forth. The remaining chapters concern regional surgery of the exterior head,—cranium, nose, eyelid, auricle, lip and so forth. In the preface the author states that it was his "original aim . . . to treat of the entire body." It is his intention "to add in the near future another volume." The author apparently plans to have the rather disproportionate section in the present volume devoted to general principles serve also for the coming volume. Each chapter is followed by a list of references, alphabetically arranged and totaling 2700 authors, of which about two thirds are referred to in the text. There are numerous cuts, many of which consist of several illustrations. These are well selected and form valuable additions to the text. There is a good double-column index of 18 pages.

The large volume is durably bound. The paper and typography are excellent.

Hygiène et cancer. By P. Delore. 16°, paper, 52 pp. Paris: Presses Universitaires de France, 1939. 6 Fr. fr.

This poorly printed little handbook is of but little interest or value.

Gynecologic Operations and Their Topographic-Anatomic Fundamentals. By Heinrich Martius, M.D. Translated by W. A. Newman Dorland. 4°, cloth, 486 pp., with 404 illustrations, mostly colored. Chicago: S. B. Debour, 1939. $10.00.

This volume, written by the director of the University Women's Clinic in Göttingen, is devoted entirely to gynecologic surgical technic. Standard gynecologic procedur are described, as well as the more unusual and difficult operations, such as the radical hysterectomy of Wertheim. The description and illustration of operative procedures for urinary fistulas are of particular merit. There are differences in detail between the procedures described by Martius and those commonly used in this country, but on the whole they are quite similar.

Since diagnostic procedures and indications for operation are not discussed but only mentioned briefly, the book must be used as a supplement to other gynecologic works. The greatest usefulness of this book will be in the surgeon's room of the hospital where the staff can consult it readily about operative questions.

The illustrations are plentiful and clear, so that each operation can be readily understood. The workmanship in the book is of the best.

Berzelius-Porträtt. Arne Holmberg. 4°, paper, 32 pp., with 35 illustrations and 32 full-sized plates. Stockholm: Almquist & Wiksells, 1939.

This is a brief account of Berzelius, with a short bibliography. It is accompanied by thirty-two superb plates showing statues, medals, drawings and paintings of the great Swedish scientist at various stages of his life. The book is a splendid addition to facts concerning this great man, whose anniversary has recently been commemorated by a Swedish postage stamp in his honor.

The Patient as a Person: A study of the social aspects of illness. G. Canby Robinson, M.D., LL.D., Sc.D. 8°, cloth, 423 pp. New York: The Commonwealth Fund, 1939. $3.00.

A quickening of interest in the social aspects of disease has become evident in many places. The outlook of a man in whom this interest has been active for more than thirty years has been used here to guide the assembling and presentation of social data on a series of ordinary urban hospital cases. The result is essentially a book of social case histories, somewhat stereotyped, but nevertheless recording a large amount of diligent labor.

Frequently interspersed comments provide a prolonged argument for greater emphasis on the subjective elements of the practice of medicine. The reviewer could not escape the feeling that he and his fellow practitioners were being gently reprimanded. There is in the book something of the social workers' conviction that one can always find what one looks for, and there are repeated asseverations that "adverse social conditions produce excessive emotional reactions." No attempt is made to suggest the reversibility of this dictum.

For hospital-bound professors of medicine, for medical students and for some specialists and consultants the book has much value. Those who have successfully practiced medicine will judge it commonplace.

Poliomyelitis in the City of Melbourne, 1937-8. By Hilda W. Bull, B.Sc., M.B., B.S., D.P.H. 4°, paper, 56 pp., with maps, charts and tables. Melbourne: Health Committee of the Melbourne City Council, 1939. Complimentary.

The medical officer of the Department of Health, Melbourne (Australia) City Council, has published an extensive account of an epidemic of poliomyelitis that devastated the city a few years ago. This is accompanied by maps, showing the beginning of the epidemic, the meteorological data and the spread of the epidemic through the various sections of the city, and a somewhat detailed account of the 174 cases and the 199 abortive infections which occurred in a population of about 92,000. Seven per cent of the paralytic cases died, and only 6 of the definite cases recovered without paralysis. It is believed that the installation of a number of respirators saved many lives. The epidemic, in general, did not differ from those which have preceded it, but another important account has been made of an outstanding epidemic disease. The care with which this record has been compiled deserves particular commendation.

Précis de médecine des enfants. P. Nobécourt. Sixth edition, entirely revised. 8°, cloth, 1303 pp., with 604 illustrations. Paris: Masson et Cie, 1939. 175 Fr. fr.

When a scientific textbook passes through as many editions as has this book, it may be taken for granted that it has served, and is still serving, a very useful purpose. But its value to Dr. Nobécourt's compatriots is one thing; its value to the average American reader another. The latter will not perhaps resort to a treatise in a foreign tongue, except for two very special reasons — either because it embodies an original piece of research, or because its point of view or method of approach differs from the ordinary. There is nothing novel here in either direction. This is not said to belittle the book, but simply to point out that it contains no more matter, nor matter much differently presented, than is available in texts printed in English, which, at least for most of us, are easier to use.

The book is safe and sane, one which though concise is comprehensive in scope, covering indeed the whole field of pediatrics with the exception of infant feeding. It is well printed, well illustrated and more convenient to handle than the majority of medical texts. One grave fault is the lack of an index. Such an omission is always exasperating and often enough leads to indifference to a book which really ought not to be neglected.

Endocrine Gynecology. By E. C. Hamblen, B.S., M.D., F.A.C.S., with a foreword by J. B. Collip, M.D. 4°, cloth, 453 pp., with 169 illustrations. Springfield, Illinois: Charles C Thomas, 1939. $5.50.

This book is very useful and worth while. It should be valuable to those with but little understanding of female endocrinology; it should increase the knowledge of those with a fair understanding; and it should be important as a reference book to those participating in endocrine investigations. The plan of the book is sound; descriptions of normal physiology are clear, and personal deductions are helpful. There are a few omissions, among them Albright's disease, panpituitary atrophy following obstetric

calamities, senile osteoporosis and "17-ketosteroid" determinations. The author's observations of the effect of progesterone on abnormal bleeding will not be accepted everywhere. Where there is incomplete agreement of any point, the author is careful to present evidence on both sides, including his own, and he does not make dogmatic statements.

This book should be read by practitioners, surgeons and gynecologists, and from it a much better understanding of functional changes will be had. The book is highly recommended.

Miss Susie Slagle's. By Augusta Tucker. 8°, cloth, 332 pp. New York and London: Harper & Brothers, 1939. $2.50.

This is a novel with considerable medical interest. The scene is laid in Baltimore, during the early days of the Johns Hopkins Hospital and University School of Medicine. Miss Slagle runs a medical boarding house, and the principal characters are young medical students. Incidentally, there is mention of the famous teachers of medicine, such as Kelly, Halsted, Welch and Osler. Unfortunately the story is not very interesting, nor is it an excellent picture of medical-school life. The author has missed a fine opportunity to depict the young doctor in the making. One can read the book with a fair amount of interest, but the story fails to hold the attention of the reader. Except for a few scattered pages, one cannot recommend this book as a medical item.

The Inter-Relationship of Mind and Body: The proceedings of the association, New York, December 27th and 28th, 1938. Association for Research in Nervous and Mental Disease. Vol. XIX of a series of research publications. Editorial Board: Foster Kennedy, Angus M. Frantz, and Clarence C. Hare. 8°, cloth, 381 pp., with 28 illustrations and 10 tables. $6.00.

This book is a summary of the papers read before the Association for Research in Nervous and Mental Diseases, at the meeting held in New York City in December, 1938. During the meeting particular attention was directed toward an evaluation of the hereditary factors in mental diseases, the significance of alterations of mental and emotional processes produced by diseases of the brain, the effect of vitamin deficiency on mental and emotional processes, and topics of a similar nature. Each subject was discussed by an individual of experienced qualifications. The book has a high mean value, for none of the contributions can be considered as poor, and many of them are excellent. Its appeal will naturally be limited, but for those whose interests lie in the field of psychiatry and its many problems, this book is a welcome addition to the literature.

Illustrations of Surgical Treatments, Instruments and Appliances. By Eric L. Farquharson, M.D., F.R.C.S.E., with a foreword by Sir John Fraser. 8°, cloth, 338 pp., with 259 illustrations and 57 plates. Baltimore: Williams & Wilkins Company, 1939. $6.50.

While there is quite general agreement throughout the world with regard to the basic principles of surgical treatment, in the actual mechanical application of these principles every surgeon becomes a rugged individualist. No two surgeons, for example, would apply a plaster boot for an ankle fracture in exactly the same way. In this book, the author presents the art and craft of surgery as practiced at the Royal Infirmary, Edinburgh, in relation to intravenous infusions, transfusions, the common fractures and minor orthopedic conditions. Many of the procedures described are credited to Boehler, but are better presented and illustrated than in his textbook. In this country, the advocated treatment of fractures of the pelvic girdle will not receive much support, nor can the immediate strapping of sprains be recommended. Although the use of various types of adhesive tape is well described, there is no mention of any method of protection of the skin beneath the tape, such as painting with compound tincture of benzoin. The last two thirds of the book is devoted to illustrations and descriptions of the instruments and appliances commonly used on the general surgical service.

The book should be of particular interest to the junior student of surgery and to the surgeon called on to treat fractures.

Vitamin D: Chemistry, physiology, pharmacology, pathology, experimental and clinical investigations. By C. I. Reed, Ph.D., H. C. Struck, Ph.D., and I. E. Steck, M.D. 8°, cloth, 371 pp. Chicago: University of Chicago Press, 1939. $4.50.

This remarkable world has for the past decade enjoyed a promotion of vitamins for the treatment of all and sundry conditions. Since vitamins are directly related to health, just as are water balance, sleep and proper food, the public has been taught to accept vitamin preparations as specific antidotes and to expect their physicians to uphold this view. Hand in hand with this situation there has appeared an enormous scientific literature on the subject of vitamins.

To help us all, monographs reviewing the subject are written; it is with this intent that the authors have presented the volume on vitamin D, its chemistry, physiology and medical uses. On the whole the text is good, but the reader should be cautioned against the claims made for this vitamin in the treatment of arthritis. With this exception, the book is to be recommended without restriction, for the summaries are carefully written. To the entire text is added an extensive bibliography. The book should serve all those working on problems of nutrition, interested physicians, and, in particular, the pediatrician who today must properly evaluate the use of vitamins.

A Doctor Without a Country. By Thomas A. Lambie, M.D., Sc.D., F.R.G.S., with an introduction by Howard A. Kelly, M.D., F.A.C.S., LL.D. 8°, cloth, 252 pp., with 6 illustrations. New York: Fleming H. Revell Co., 1939. $2.00.

Dr. Lambie, who comes from an old Maryland family, devoted his early medical life as a missionary, far up the River Nile in a small United Presbyterian mission in which he was the only doctor. His life is described in considerable detail. There is a strong religious element in the man, which is apparent at all times. Although he seems to have been a sound surgeon and good physician, his life was closely woven with this strong religious bent. Later, he went to Ethiopia where he built a hospital just before the evacuation of the country and the overcoming of the Ethiopians by the Italians. He was on intimate terms with all the notable people in Ethiopia, and the last third of the book is by far the most interesting part, giving as it does a detailed story of the final days of Ethiopia as a nation. The book suffers from a somewhat stilted style, and it cannot be read with avid interest. It is a little too factual to make the narrative run smoothly. Nevertheless, many medical men should be enlightened by the book, which appears to be a straightforward, honest account of a doctor's unusual travels. The make-up and the title of the book leave much to be desired; the illustrations are not of any great value. It is recommended, however, for those who are interested in the subject, and particularly all young physicians embarking on the arduous life of a missionary doctor.